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MONTHLY WEATHER REVIEW

DECEMBER 1946

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Contour lines and isotherms based on radiosonde observations at 0300 G.C.T., and winds based on pilot balloon observations at 2200 G.C.T.

CORRECTION

MONTHLY WEATHER REVIEW, vol. 74, p. 163, September 1946: "Severe Local Storms" table, the "Character of Storm" column for North Carolina storm of September 19–20 should read "Disturbance" instead of "Tropical disturbance."

MONTHLY WEATHER REVIEW

Acting Editor, Robert N. Culnan

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THE WEATHER OF 1946 IN THE UNITED STATES

J. L. BALDWIN [1]
[Weather Bureau, Washington, D. C.]

The outstanding climatic feature of 1946, with reference to agriculture, was the generally favorable influence of the year's weather on the production of the greatest total output of crops in the Nation's history. This favorable influence was noteworthy principally for the record yields of wheat, corn, potatoes, and soybeans it helped produce at a time when war-devastated Europe and Asia were in large measure dependent upon the United States for subsistence. On the darker side, however, wet weather in the heart of the Cotton Belt, accompanied by an infestation of boll weevil, resulted in a disappointingly low production of cotton; and frequent rains and high humidity in the East during part of the growing season promoted the development of the tomato blight, with serious reductions in the crop yield.

Usually warm conditions during the first part of the year, especially during March, caused vegetation to advance 2 to 4 weeks ahead of normal schedule over the entire country except the Pacific Coast States. April weather permitted unusual progress in spring work and seeding grains, but some crops were set back and fruits damaged by widespread frosts in the western North-Central States during this month and the following, especially. Late May and June conditions were quite favorable in the Corn Belt, though the Ohio Valley and other districts experienced frequent heavy rains which retarded planting and cultivation. Though July weather brought a general improvement, unfavorable dryness became evident in sections of North Dakota and Minnesota, the central and southern Great Plains, parts of the southern Great Lakes region, and in the far Southwest. Rains near the end of summer finally relieved these areas. In general, summer and fall were favorable for crop maturing and harvesting over most of the country.

Preliminary estimates of loss of life and property due to severe 1946 storms are as follows: Tornadoes, 77 killed and $12,574,000 damage; hurricanes, no deaths and $10,000,000 damage; other violent windstorms, rainstorms, and hailstorms, 53 killed and over $50,000,000 damage.

Temperatures.—The mean temperature for the year, derived by weighting the average temperatures of the several States according to their areas, was 54.2°, or 1.0° above the average for the period 1886 to 1946. During that period the highest mean annual temperature for the United States was 55.4° in 1934, and the lowest, 51.3°, in 1917.

Monthly and annual State temperature departures are shown in table 1, supplemented by a chart of the annual areal distribution of temperature.

Temperatures during 1946 averaged higher than usual over practically the entire country, with the exception of California and Oregon. The annual departures from normal exceeded +2 degrees quite generally in the central Great Plains, middle Mississippi and lower Ohio Valleys, and Great Lakes region.

The highest State yearly average was 72.4°, for Florida; the lowest, 40.8° for North Dakota. The greatest monthly average was 83.6° for Oklahoma in July, followed by Texas with 83.5° for August; while the lowest was the February average of 10.4° for North Dakota. The highest temperature recorded during the year was 123°, observed at Cow Creek, Calif., on August 2; and the lowest was −49° at two stations in Minnesota on December 31. For comparison, the highest temperature ever recorded in the United States was 134° at Greenland Ranch, Death Valley, Calif., on July 10, 1913; and the lowest, −66° at Riverside Ranger Station, Wyo., on February 9, 1933.

Precipitation.—The average annual precipitation for the country as a whole, based on weighted averages, was 30.90 inches, 1.73 inches more than the average for the period 1886 to 1946. During the period the wettest year had been 1945, with 32.89 inches, and the driest, 1910, with 24.65 inches.

Figure 1 gives the percentages of normal precipitation by States for 1946; figure 2, the percentages for the growing season; table 2, the percentages by month and for the year; and table 3, the monthly and annual amounts. The areal distribution of annual precipitation is shown in percentages on the chart.

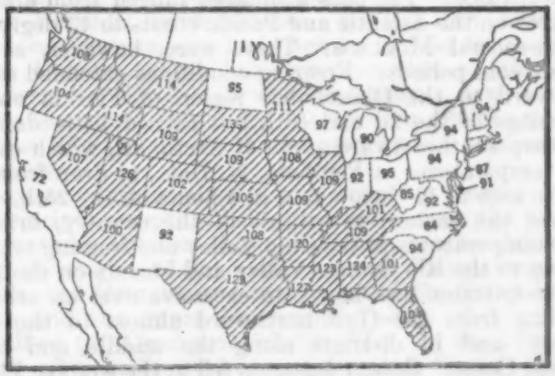

FIGURE 1.—Percentage of normal precipitation, 1946. (Shaded States normal or above.)

[1] The writer is greatly indebted to Weather Bureau officials in the field, especially the section directors, and to many cooperating individuals and agencies, such as the Bureau of Agricultural Economics, whose reports assisted in making this article possible.

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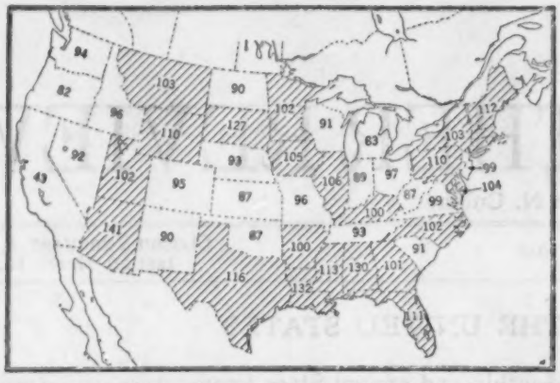


FIGURE 2.—Percentage of normal precipitation, April 1–September 30, 1946. (Shaded States normal or above.)

The year 1946 was wetter than usual from the Gulf States to eastern Missouri and Illinois; in most northern sections from the upper Mississippi Valley to Idaho; and in the central portion of the western Plains, eastern Colorado, western Washington, and most of Arizona. Precipitation was rather scant in northern California, northern North Dakota, southeastern Kansas, and northeastern Oklahoma. In the middle and southern Great Lakes region, the middle Ohio Valley, and north Atlantic coastal areas, conditions were generally quite dry.

The average annual precipitation for most of the various States fell within 10 percent of the usual amounts, though it ranged from 71 percent for California to 133 percent for South Dakota. States receiving an average of over 50 inches of precipitation during 1946 were Louisiana, Alabama, Arkansas, Florida, Georgia, Mississippi, and Tennessee. The wettest State was Louisiana, with an average annual precipitation of 71.60 inches; the driest State was Nevada with 9.71 inches. Louisiana is normally the wettest State and Nevada the driest.

Average State precipitation during the April to September growing season exceeded the normal values by more than 15 percent in Louisiana, Alabama, Texas, Arizona, and South Dakota. Conversely, deficiencies greater than 15 percent were recorded in Michigan, Oregon, and California; elsewhere, average State deviations were less than one-seventh of the usual seasonal totals. Precipitation during the growing seasons ranged from 43 percent of normal in California to 132 percent in Louisiana.

January.—This month, as a whole, was milder than usual over practically the entire country, the principal exceptions being Maine, southern Texas, and southern New Mexico. The plus anomalies ranged from about 2 degrees on the Atlantic and Pacific coasts to 13 degrees in north-central Montana. There were, however, several severe cold periods. Freezing conditions extended southeastward to the Okeechobee region of Florida on the mornings of the 2d and 19th but caused little damage. A sharp southeastward surge of Arctic air, which caused the temperatures at Pembina, N. Dak., to drop from 14° above zero to 16° below zero in 6 hours on the 25th, overspread the eastern two-thirds of the country, bringing zero temperatures to the Ohio Valley and freezing temperatures to the Rio Grande Valley and Florida on the 26th.

Precipitation was heavy to excessive over an area extending from the Gulf northward almost to the Ohio Valley, and in districts along the middle and north Pacific Coast. Scanty amounts fell in the western Plains, most of the Rocky Mountain States, and the Great Basin. It was the second wettest January of record in Louisiana and the third wettest in Mississippi.

Damaging floods occurred in the southern States, particularly Kentucky, Tennessee, and Georgia, while the greatest winter floods of record were reported from Iowa, southern Minnesota, and Wisconsin. A severe sleet storm occurred over the eastern Piedmont region of North Carolina on the 16th and 17th, with depths up to 10 inches. The first tornadoes of the year struck northeastern Texas on the 4th, killing 30 persons, injuring 335 others, and destroying $2,650,000 worth of property. Dust storms in the western portions of Nebraska, Kansas, and Oklahoma were quite severe on the 23d.

The unusual phenomenon of "snow rollers," masses of snow blown by the wind into rolls, ranging up to 2 feet in diameter, were produced by high wind and snow of suitable texture in the Avon and Silver Springs areas of New York on the 18th and 19th, and at Linesville, Pa., on the 25th.

February.—This month also averaged considerably warmer than usual, except in the far Northeast, northern Minnesota, eastern North Dakota, California, and some other areas. Monthly mean temperatures exceeded their normals by more than 10 degrees in the central Great Plains and north-central Montana. It was the second mildest February in the climatological history of Kansas.

The outstanding feature of the month's weather in the northern Plains States was the glaze, sleet, snow, and windstorm of the 5th and 6th, which assumed blizzard proportions in many areas as far south as Nebraska. This storm was the most severe of record in the Moorhead-Fargo area of the Red River Valley. West-bound trains were stalled at Fargo for almost 3 days, and in some sections drifts were 18 feet high. Duststorms in the western Plains from the Texas Panhandle to western Nebraska, in connection with this storm's circulation, reduced visibility to practically zero on the 5th in some areas and reminded "old timers" of the severe dust storms during the drought years of the '30's. Damage to wheat and topsoil, however, was not severe. A cold wave caused the temperature in Ohio and Pennsylvania to drop sharply from the highest for the month on the 14th to the lowest on the 15th, a drop of 50° at many stations within 24 hours.

Heavy precipitation continued in the Pacific States and from east Texas and the Gulf to the Ohio Valley, with generally light amounts in the Great Plains, Rocky Mountain States, Southwest, and Great Basin. This was the driest February of record in Colorado, and the second driest in New Mexico. The heaviest snow of the season fell in the Northeast on the 19th and 20th. Run-off was excessive over the South-Central States, and floods were quite general in the southern States, in some places exceeding those that occurred during January.

A tornado struck Ardmore, Okla., at 3 a. m., of the 13th, killing 1 person, injuring 15 others, and causing $1,000,000 property damage. Possibly one of the strongest earthquakes in the history of the Northwest was felt over most of Washington State and northwestern Oregon at 7:18 p. m., on the 14th. It caused considerable damage in the Seattle area, but no loss of life. A second shock at 4:16 a. m., on the 15th was much milder. The center of the quake is believed to have been in the Olympic Mountains of Washington.

March.—March of 1946 resembled in many respects the unusually warm March of the preceding year. Mean temperatures for the month were generally 12–15 degrees above their usual values in a large north-central area, extending from central Montana to eastern New York, and southward to Missouri and Kentucky. Only in sections of the Pacific States and a few adjacent areas were the averages near normal. This was the warmest March of record in Illinois, Indiana, Ohio, New York, and New

England, and the second mildest in Michigan, Minnesota, Iowa, Missouri, Nebraska, North Dakota, Montana, and Wyoming. The first 3 months of the year were the warmest for any similar period in the climatic history of Kansas, Nebraska, Montana, and some other areas.

New high temperature records for the month were established at a number of stations, especially during the last 5 days, as afternoon maxima ranged from around 100° in Texas to near 80° along the Canadian border. Vegetation was advanced by about 3 weeks in most sections east of the Rocky Mountains, with peach trees blooming nearly to the Great Lakes region and many apple orchards in bloom as far north as the Ohio Valley at the close of the month.

The weather continued wetter than usual over a region extending from east Texas, the Gulf Coast, and northern Florida to the middle Ohio Valley, with the rainfall greatest in the east-central Gulf Plains. Amounts were also heavy in the Pacific States, Nevada, Nebraska, Iowa, and other areas. It was the wettest March of record in Iowa. The winter drought in California was relieved by rains coming after the first 10 days of the month. Dry sections of the western Plains were also benefited, but the Southwest and many parts of the Northeast still needed additional moisture.

Heavy snow cover in the northern States from the Mississippi Valley to Maine was melted by the unusually warm weather with only minor local flooding, due to deficient precipitation over the critical areas.

The Aurora Borealis, or northern lights, was unusually active from the 23d to the 28th.

April.—Mostly warm weather continued over practically the entire country, the averages being slightly below normal only in New England and Washington State. Plus anomalies exceeded 8 degrees in the western Plains and eastern Rockies. It was the warmest April of record in Nebraska and New Mexico, and the second warmest in Arizona and Wyoming. This warm weather persisting from the first of the year made the 4-month period the mildest ever recorded in many north-central areas, notably in Illinois, Missouri, and Kansas.

Cold polar air brought freezing temperatures southward to the Ohio Valley, with frosts reaching to the northern portion of the Gulf States and the central Carolinas from the 11th to the 13th. Frosts were again experienced, but not quite so far south, on the 27th and 28th. Tender vegetables and fruit suffered from the Rockies to the Northeastern and Middle Atlantic States, but commercial orchards in general were not damaged severely, as they were the preceding year, so it was possible for bumper fruit crops to be gathered in many areas.

Precipitation was below normal during April over most of the country, with large sections receiving less than half of the usual amount. It was somewhat wetter than usual in the far Northeast, eastern South Carolina, southern Texas, Arkansas, southern Missouri, and extreme western Washington. This was the driest April of record in Wisconsin, Michigan, Pennsylvania, and northern Ohio, and the second driest in Montana and Wyoming. Near-drought conditions were developing in most northern and western sections of the country.

Between 4:30 and 8 p. m., of the 7th, a thunderstorm, moving southeastward from Tennessee and accompanied by considerable hail and wind, caused $2,000,000 damage over a path 20 miles wide and 150 miles long in northern Alabama. Floods in the Yazoo and Big Black Basins of Mississippi overflowed 1,250,000 acres, of which 300,000 were arable land. A considerable area was free of water in time for planting. Damage was estimated at $3,000,000.

May.—In marked contrast to the preceding months, May weather was much cooler than usual, except along the Atlantic and Gulf Coasts and in the region west of the Continental Divide. The monthly departures ranged from more than 4 degrees below normal in the central portion of the Great Plains to 4 degrees above normal in Washington and Oregon. On the 1st, a severe freeze in the Rocky Mountain region, the Great Plains, and areas to the east established new minimum temperature records for the month at many stations in Utah. Between the 8th and 13th, polar air again overspread the greater portion of the country east of the Pacific States, bringing freezing temperatures to northern Missouri and nearly to the Texas Panhandle on the 11th and 12th and to the lower Lake region and Northeast by the 13th. Many stations in the North-Central Border States reported the lowest temperatures ever recorded for so late in the season. Moderate to considerable damage was suffered by early truck produce, fruits, sugarbeets, and some spring grains, especially flax, in north-central areas.

May was considerably wetter than usual over the eastern portion of the country and in Nebraska, South Dakota, and north-central Rocky Mountain areas. Drought conditions continued in the far Southwest. Rain was unusually heavy in the Gulf States, from eastern Texas to the lower Ohio Valley, between eastern Virginia and southern New York, and in western South Dakota. It was the second wettest May of record in Louisiana, Virginia, Maryland, and Pennsylvania. Persistent heavy showers, especially on the 26th and 27th, following the driest April of record in Pennsylvania, produced record-breaking floods on many of the headwater tributaries of the Susquehanna River. They caused the death of 12 people and destroyed millions of dollars worth of property.

A hailstorm near Grand Junction, Colo., on the afternoon of the 10th, left $1,000,000 damage in its wake, mostly to fruit and vegetables. Another hailstorm, between 9 and 10 p. m. of the 16th, injured 20 people and caused over $5,000,000 property loss in San Antonio, Tex., and about $30,000 crop loss adjacent to that city. In this storm the hailstones that covered the ground ranged in size from walnuts to some as large as baseballs. Hailstones destroyed $576,000 worth of property in other parts of Texas on the same date. About 6:30 p. m. on the 29th, San Antonio was again struck by bad weather: this time, strong winds associated with a violent thunderstorm, destroyed property valued at $1,350,000 in and near the city.

June.—Unseasonably cold weather prevailed over the greater portion of the country during the first few days of the month, with freezing temperatures and light snows in the Northern Border States. By the 10th, however, afternoon temperatures had risen to 100° as far north as South Dakota, where 110° was recorded on the 23d. Averages for the month were generally a few degrees above the usual values in the western Plains, middle Rockies, and the far Southwest, and mostly near normal elsewhere.

Most sections received ample moisture during June, the principal exception being the region from the middle and southern Rockies to the California coast. Amounts were excessive in the Gulf Coastal Plain, including Florida and Georgia, and in sections of the Great Lakes region and the upper Mississippi Valley. A torrential rainfall of 11.72 inches at Mellen, Wis., on the 24th, set a new all-time 24-hour record for that State. Severe flash floods in the Bad and White River basins of Wisconsin caused $3,000,000 damage. The States of Ohio, West Virginia, and Pennsylvania reported flood losses of

over a million dollars each, and eight deaths in the latter State.

Thunderstorm winds reached an estimated velocity of 75 miles per hour during the worst windstorm in the history of Auburn, N. Y., where damage was estimated at $1,000,000. A tornado struck Detroit on the 17th and another one on the 27th, resulting in 44 injuries and $1,500,000, property damage. The first of these tornadoes killed 15 persons and injured 49 others on the Canadian side.

July.—The month was typically hot over the western two-thirds of the country, with the plus anomalies exceeding 4 degrees in most sections of the western Plains and some northern Rocky Mountain areas. Temperatures were mostly moderate in the Atlantic and Middle and East Gulf States. Cool weather overspread the Northeast on the 16th and 17th, and brought the lowest temperatures ever recorded during July at a number of stations in New England.

Most of the central third of the country was dry during July. Precipitation ranged from 6 inches to more than 15 inches in most sections of the south Atlantic and middle and east Gulf Coastal Plains.

Approximately 110 severe local storms occurred during July, accounting for 10 deaths and property damages amounting to over $7,500,000. Heavy hail on the 2d caused $1,250,000 damage in Cheyenne County, Kans., mostly to wheat ready for harvest. A severe hailstorm did $1,000,000 damage in McCone County, Mont., on the 16th. Lightning set fire to and destroyed a textile mill and contents valued at considerably over $2,000,000, on the 4th near Langley, S. C.

August.—The eastern and north-central portions of the country were somewhat cooler and the far West and Southwest much warmer than usual, with the departures ranging from more than 3 degrees below normal in the Ohio Valley to about the same amount above in the Great Basin. It was the coolest August of record in Kentucky and the second coolest in Pennsylvania and West Virginia. A southward surge of cold polar air at the end of the month brought the lowest temperatures ever recorded in August to many eastern stations as far south as Tennessee and North Carolina.

Rainfall was spotty, but locally heavy to excessive in Atlantic and Gulf Coastal areas, Arizona, and many central States, especially in the Missouri-southern Illinois area. It was dry in the Pacific States and across the northern third of the country, except in New England where more rain occurred at several stations in eastern Massachusetts and Rhode Island than ever before during August. A total of 21.71 inches fell at East St. Louis, which was the greatest amount of rainfall ever recorded at any station during any month in Illinois. A similar new all-time record for 109 years was established in St. Louis by an August total of 20.45 inches. A total of 11.00 inches was measured for a 24-hour period at Nashville, Ill., on the 15th and 16th. Floods caused the loss of several lives and $8,258,000 worth of property damage in southern Illinois. Lightning struck the tanker *Homestead* at Jacksonville, Fla., on the 5th, causing a $2,000,000 fire loss. On the 26th the farmers of Rockingham, Guilford, and Orange Counties, N. C., suffered a hail loss of almost a million dollars, with hail 1½ inches deep in some areas.

September.—This month was somewhat warmer than usual over the Northeast and far Southwest, including California, while minus departures ranged from 1 degree to about 3 degrees below normal in the east-central Gulf States; elsewhere, temperatures generally averaged near-normal.

Precipitation was heavy in the upper Mississippi Valley, western Plains, Arizona, northern Rockies, and sections of the Atlantic States. It was especially heavy in the Gulf Coastal Plains. Very heavy rainfall, estimated at about 11.50 inches, fell in the vicinity of San Antonio, Tex., from the 25th to the 27th, causing the greatest flood the area had experienced since September 1921. Several lives were lost and property damage amounted to millions. A series of thundersqualls swept over west-central Minnesota on the 5th, causing one death and $900,000 damage to farm installations, crops, and livestock. At Butte, Mont., a record-breaking September snowfall of 6.5 inches in 24 hours on the 16th and 17th damaged transmission lines and trees.

October.—Warmer-than-usual weather prevailed over the eastern half of the country and the southern Plains, including all of Texas, while it was generally cold for the month elsewhere. The monthly departures ranged from more than 6 degrees above normal in the lower Great Lakes region to about 5 degrees below in eastern Oregon. This October equalled the coldest October of record in Oregon and was the second coldest in Washington and Idaho. A persistent southwesterly flow of warm air caused record-breaking temperatures to be recorded at many stations situated east of the Mississippi River during the last 4 days of the month. At the same time, cold northerly currents over the far West established many new low October temperature marks for the region, with some of the earliest killing frosts of record experienced over the northern two-thirds of California.

The month was generally wetter than usual, except in the Gulf States, most of the Ohio Valley, and the Middle Atlantic States. It was the wettest October in the climatic history of Nebraska, South Dakota, Montana, and western Kansas, and the second wettest October in Wyoming. Idaho precipitation equalled the record for the month. In contrast to the scanty snowfall that fell during October of the preceding year, snows were frequent and extensive across the northern States and in the Rocky Mountains. An unseasonably early snowstorm occurred over northern New York and northwestern New England, with depths ranging up to about 2 feet. Some stations in this area reported the greatest snowfall for any October of record, notably Canton, N. Y., with 11 inches.

A hurricane which had been reported as severe in the Gulf quickly lost its force a few hours before striking the Tampa Bay area of Florida. It moved northward over that State on the 7th and 8th, and thence across Georgia and the Carolinas, to pass out to sea over the North Carolina coast without causing much damage. The potential damage, especially to the prospective record-breaking citrus crops, was so great that the actual damage, probably about 2 percent, or approximately $5,000,000 seemed very small. Other property damage totaled about $200,000. The advisories issued by the Weather Bureau Forecast Center at Miami were very accurate and timely.

November.—Unseasonably warm weather continued over most of the eastern half of the country and rather cold weather over the West. The average temperatures ranged from more than 6 degrees above normal in the South Atlantic and East Gulf States to about the same amount below the usual in north-central Montana. It was the warmest November of record in Florida and Georgia; equalled the record November average for Alabama; and was the second warmest November in North

Carolina. The highest temperatures ever recorded during November were reported during the first few days of the month from eastern States, notably Pennsylvania and North Carolina. A cold wave established new low temperature records for November at a number of stations in Montana on the 21st and brought killing frost southward to the central part of Mississippi by the 23d.

November was much wetter than usual from central Illinois and southern Missouri southward over the lower Mississippi Valley and eastern Texas. Precipitation was also generally above normal from the central Great Plains westward.

On November 1, a minor tropical disturbance entered Florida near Palm Beach and on the 3d drifted out into the Atlantic off Jacksonville, after causing some small crop damage by reason of its heavy rains.

The most protracted snowfall in the climatic history of eastern Colorado, and the second heaviest fall of record for that area, occurred from the 2d to the 6th. Snow fell for 71 hours and 14 minutes without interruption in Denver, amounting to 31 inches. Thirteen deaths and a $10,000,000 economic loss were attributed to this storm. Food and supplies were dropped by plane or taken to isolated homes, as well as to stranded herds of livestock, by dogsled or Army "weasels". Drifts ranged up to 12 feet.

Excessive rains in Beaumont, Tex., and vicinity on the 3d and 4th caused flooding and damage estimated at $3,000,000, principally to business houses and homes in the city.

December.—This month averaged much warmer than usual over practically the entire country, the exceptions mostly being near-normal areas in northern border districts and Pacific coastal areas. The plus anomalies exceeded 5 degrees quite generally from the middle Atlantic Coast westward over the middle portion of the country almost to the Pacific States, with many stations in Colorado, southwestern Wyoming, and adjoining sections reporting monthly departures of over 8 degrees above normal. Unseasonably warm weather was displaced by an outbreak of cold polar air near the end of the year. The change was quite sharp, for instance, in Missouri, where the temperature dropped from near record-breaking readings in the middle 70's on the 27th to 7 degrees below zero by the morning of the 30th. Freezing temperatures were recorded as far south as Brownsville, Tex., on the 31st, and vegetables suffered some damage in west Gulf areas and the far Southwest.

Precipitation was heavy in north-central Texas, eastern Oklahoma, southern Missouri, Wyoming, and some adjacent areas; while less than half the usual amounts fell in the Southeast, the middle portion of the Western Plains, most of Colorado, Arizona, northern New Mexico, eastern Washington, and eastern Oregon, and sections of northern California. Drought conditions were developing in Florida and southeastern Georgia as the year closed.

TABLE 1.—*Monthly and annual temperature departures from normal for the year 1946*

State	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Alabama	+1.9	+2.3	+5.4	+3.5	−0.5	−1.7	−0.9	−1.4	−2.3	+0.4	+6.3	+4.4	+1.5
Arizona	−0.9	−2.0	+0.6	+4.8	+0.2	+2.4	−0.2	+0.6	+1.3	−3.2	−3.4	+3.5	+0.3
Arkansas	−0.1	+3.9	+5.5	+3.4	−2.7	−1.5	+0.3	−1.1	−1.9	+0.9	+2.2	+5.5	+1.2
California	−0.5	−3.2	−1.4	+1.2	−0.4	−1.1	−0.5	+0.4	+0.8	−3.8	−3.9	+0.2	−1.0
Colorado	+0.4	+1.9	+4.0	+6.0	−2.4	+1.7	+1.5	−0.2	+0.7	−3.8	−4.1	+5.5	+0.9
Florida	+1.8	+1.2	+1.9	+1.5	+1.2	−0.7	−0.1	−0.1	−0.3	+1.1	+0.1	+4.2	+1.5
Georgia	+1.5	+2.0	+4.4	+2.0	−1.0	−1.6	−1.0	−1.1	−2.4	−0.7	+6.0	+3.6	+1.0
Idaho	+0.2	−0.6	+2.3	+2.3	−0.3	−0.4	+0.5	+0.5	−1.2	−5.7	−1.8	+4.6	0.0
Illinois	+2.5	+4.7	+11.6	+3.5	−2.8	+0.1	−0.2	−3.8	−0.9	+3.9	+3.1	+5.5	+2.2
Indiana	+1.8	+3.9	+11.8	+2.3	−2.3	−0.2	−0.6	−4.0	−0.4	+4.2	+4.3	+4.6	+2.1
Iowa	+4.0	+6.2	+12.2	+5.1	−3.6	+0.2	−0.8	−3.3	−0.7	+3.9	+1.7	+5.3	+2.5
Kansas	+4.4	+8.5	+8.9	+5.6	−3.3	+2.0	+2.1	−0.2	−0.8	+1.1	−0.4	+5.6	+2.8
Kentucky	+1.2	+3.6	+9.5	+3.4	−1.8	−0.8	−1.0	−5.1	−2.0	+1.2	+4.7	+4.6	+1.4
Louisiana	−0.3	+1.1	+2.2	+2.7	−0.4	−1.5	−0.6	−0.6	−0.9	+1.0	+3.9	+3.6	+0.8
Maryland-Delaware	+2.1	+3.6	+7.6	−0.1	−0.3	−1.2	−1.3	−3.4	+0.3	+3.2	+4.4	+2.6	+1.4
Michigan	+2.2	+0.4	+11.6	+1.9	−2.0	−1.2	−0.1	−2.2	+0.6	+4.8	+2.8	+1.2	+1.7
Minnesota	+1.6	−0.6	+10.8	+4.5	−2.8	−0.6	+0.1	−2.0	−1.9	+0.1	−0.4	−0.2	+0.7
Mississippi	+0.1	+2.1	+4.1	+3.0	−1.5	−1.8	−1.1	−0.7	−1.5	+0.5	+4.9	+3.8	+1.0
Missouri	+2.9	+7.4	+11.1	+4.3	−3.1	+0.3	+0.8	−2.5	−1.4	+3.3	+2.5	+6.0	+2.6
Montana	+5.6	+4.2	+7.1	+4.2	−1.8	−0.8	+0.9	−0.6	−0.9	−5.5	−4.1	+1.0	+0.8
Nebraska	+6.2	+7.9	+9.7	+6.8	−4.0	+1.6	+0.7	−1.4	−0.5	−1.2	−1.2	+4.5	+2.4
Nevada	+2.2	+0.4	+1.6	+4.7	+1.1	+1.9	+0.8	+2.3	+1.1	−3.5	−1.8	+4.9	+1.3
New England	−0.4	−2.3	+9.2	−1.3	−1.0	−0.6	−1.1	−2.3	+1.7	+3.4	+3.4	+1.1	+0.8
New Jersey	+1.8	+1.6	+8.5	+0.3	+0.2	−1.0	−0.7	−2.8	+1.6	+4.3	+4.4	+2.9	+1.8
New Mexico	−2.5	−0.6	+3.2	+5.3	−1.1	+1.9	+0.7	+0.6	+1.7	−0.1	−2.4	+4.7	+1.0
New York	+1.4	−0.4	+10.9	−0.3	−1.2	−1.1	−0.6	−2.7	+1.8	+4.5	+4.4	+2.6	+1.6
North Carolina	+1.2	+2.1	+6.4	+1.5	−0.7	−1.0	−1.4	−2.5	−1.4	+0.8	+5.2	+3.7	+1.2
North Dakota	+4.3	+0.5	+10.8	+6.6	−2.9	+0.4	+1.6	−1.3	−0.5	−4.0	−1.4	−0.1	+1.2
Ohio	+2.5	+3.4	+11.4	+1.0	−1.7	−0.7	−1.0	−4.7	0.0	+4.0	+4.5	+3.8	+1.9
Oklahoma	+0.9	+6.0	+5.7	+4.6	−2.4	−0.6	+1.8	+0.7	−1.8	+1.9	−0.6	+5.7	+1.8
Oregon	+0.6	−0.6	−0.1	+0.5	+0.7	−1.6	−1.0	+0.3	−1.2	−5.4	−2.7	+2.6	−0.6
Pennsylvania	+1.0	+0.9	+9.3	−0.9	−1.4	−2.4	−1.5	−3.3	+0.1	+3.4	+3.3	+2.3	+0.9
South Carolina	+1.0	+1.2	+5.3	+1.4	−1.1	−1.1	−1.7	−1.9	−1.7	+0.2	+5.2	+3.8	+0.9
South Dakota	+5.5	+5.8	+10.8	+6.9	−3.4	+0.4	+0.8	−2.4	−1.1	−3.5	−1.0	+2.5	+1.8
Tennessee	+1.0	+2.9	+7.8	+3.3	−1.9	−0.9	+0.1	−3.1	−1.7	+0.7	+5.4	+4.5	+1.5
Texas	−1.9	+1.7	+2.6	+3.5	−0.6	−1.4	+0.8	+0.7	−0.8	+1.7	+0.4	+3.7	+0.9
Utah	−1.5	−0.3	+2.0	+4.3	−1.1	+1.8	+1.3	+1.5	+0.7	−3.7	+2.0	+6.3	+1.1
Virginia	+1.1	+2.6	+6.4	+1.3	−1.0	−1.2	−2.0	−3.5	−0.7	+1.7	+4.7	+3.9	+1.1
Washington	+3.2	+1.8	0.0	−0.5	+2.5	−2.0	−0.4	+0.3	−0.7	−4.2	−3.5	+0.5	−0.2
West Virginia	+2.0	+2.5	+8.1	+1.4	−1.0	−0.8	−0.7	−4.3	+1.2	+2.5	+5.1	+3.6	+1.6
Wisconsin	+3.6	+1.7	+10.9	+3.8	−1.7	−0.9	−0.1	−1.4	−0.8	+3.9	+1.9	+2.5	+2.0
Wyoming	+3.0	+3.6	+6.5	+7.2	−2.8	+1.1	+2.2	+0.5	+0.5	−3.5	−0.6	+6.6	+2.0

TABLE 2.—*Percentage of normal precipitation, 1946*

State	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Alabama	170	123	137	68	191	128	126	104	186	52	155	55	124
Arizona	100	21	50	144	31	12	110	126	198	100	149	79	100
Arkansas	168	145	117	113	196	50	105	52	44	93	244	99	120
California	29	50	89	21	59	13	471	56	43	88	206	74	72
Colorado	62	33	105	79	116	60	100	129	69	159	310	45	102
Florida	101	83	135	43	194	101	123	97	104	66	130	37	104
Georgia	146	86	127	96	193	94	85	68	100	133	90	27	101
Idaho	92	102	123	60	90	90	109	102	122	181	163	111	114
Illinois	91	105	89	57	151	113	75	178	57	126	182	106	109
Indiana	49	127	84	48	152	106	79	98	41	100	123	106	92
Iowa	169	34	243	45	111	148	70	99	132	156	109	53	108
Kansas	180	77	153	65	90	81	59	95	133	224	205	64	105
Kentucky	90	148	95	53	140	101	103	118	87	92	101	84	101
Louisiana	182	127	166	67	252	148	140	78	107	60	166	66	127
Maryland-Delaware	50	76	68	56	173	108	90	101	97	91	55	67	91
Michigan	112	95	90	39	110	110	87	80	87	77	103	129	90
Minnesota	80	136	157	51	98	143	74	58	173	202	118	109	111
Mississippi	186	152	125	46	190	129	149	68	92	71	191	60	123
Missouri	127	134	88	86	146	58	75	148	56	108	243	112	109
Montana	83	77	101	46	92	90	156	82	171	240	147	147	114
Nebraska	50	26	203	28	124	88	69	79	179	298	246	26	109
Nevada	33	33	162	52	110	14	263	89	72	282	260	81	107
New England	88	92	42	79	150	90	86	167	100	62	57	111	94
New Jersey	48	61	83	41	179	136	125	95	87	41	44	67	87
New Mexico	131	22	104	50	58	36	84	143	107	142	148	49	92
New York	58	93	54	61	149	103	96	97	108	108	76	107	94
North Carolina	120	99	82	108	134	79	119	78	100	110	108	54	84
North Dakota	41	135	132	47	72	89	87	83	173	216	58	113	95
Ohio	34	124	92	50	155	153	81	74	48	124	101	93	95
Oklahoma	196	184	105	86	130	81	30	102	68	71	272	166	108
Oregon	99	95	112	50	89	111	107	85	83	161	130	83	104
Pennsylvania	42	79	91	34	189	146	94	93	95	110	43	74	94
South Carolina	117	76	97	115	122	55	110	91	61	166	123	35	94
South Dakota	25	107	149	68	156	134	83	82	279	289	113	73	133
Tennessee	176	133	100	69	130	69	100	82	116	100	141	89	109
Texas	193	120	119	96	145	107	57	136	145	118	191	85	123
Utah	79	33	121	128	160	16	87	144	30	382	223	144	126
Virginia	94	88	76	78	158	79	109	76	92	86	72	69	92
Washington	111	127	112	99	82	175	87	53	76	128	102	102	108
West Virginia	65	100	94	56	125	120	70	67	74	94	60	74	85
Wisconsin	142	64	102	33	81	162	51	69	122	107	127	109	97
Wyoming	67	63	119	48	155	118	72	106	150	207	100	88	109

TABLE 3.—*Monthly and annual precipitation (inches), 1946*

State	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Alabama	8.42	6.58	7.98	3.02	7.47	5.52	6.90	4.87	6.08	1.42	4.97	2.74	66.06
Arizona	1.25	0.28	0.51	0.82	0.10	0.04	2.30	2.88	2.54	0.82	1.43	1.02	13.99
Arkansas	7.44	5.05	5.47	5.46	9.47	2.12	3.94	1.87	1.48	2.79	9.09	4.18	58.36
California	1.42	2.17	3.27	0.36	0.59	0.04	0.33	0.05	0.20	1.07	4.97	2.92	17.39
Colorado	0.49	0.32	1.36	1.40	2.13	0.84	2.20	2.52	0.94	1.80	2.39	0.40	16.79
Florida	2.81	2.58	4.26	1.22	7.76	6.78	9.05	6.76	6.93	2.74	2.76	1.04	54.69
Georgia	6.29	4.22	6.23	3.49	6.73	4.23	4.97	3.60	3.71	3.61	2.33	1.17	50.58
Idaho	2.04	1.78	2.22	1.00	1.58	1.21	0.70	0.61	1.25	2.62	3.38	2.29	20.68
Illinois	2.16	2.07	2.80	1.97	6.08	4.40	2.40	5.97	2.07	3.18	4.74	2.23	40.07
Indiana	1.57	3.09	3.11	1.72	6.06	4.12	2.62	3.31	1.35	2.71	3.74	2.87	36.27
Iowa	1.82	0.36	4.18	1.23	4.45	6.41	2.45	3.56	4.94	3.39	1.74	0.63	35.16
Kansas	1.24	0.77	2.21	1.64	3.44	3.16	1.85	2.97	3.66	4.22	2.56	0.57	28.29
Kentucky	4.02	5.23	4.47	2.13	5.50	4.16	4.23	4.42	2.52	2.38	3.45	3.19	45.70
Louisiana	8.85	5.72	7.68	3.21	11.25	7.23	8.52	4.02	4.08	1.94	6.45	3.54	71.49
Maryland-Delaware	1.69	3.70	2.51	1.98	6.48	4.17	4.00	4.44	3.33	2.75	1.41	2.20	38.66
Michigan	2.28	1.68	1.85	0.92	3.50	3.40	1.54	2.23	2.74	2.06	2.61	2.62	27.43
Minnesota	0.64	1.03	1.82	1.09	3.10	5.71	2.42	1.84	4.78	3.68	1.37	0.83	28.31
Mississippi	9.62	7.49	7.07	2.27	8.12	5.89	7.54	2.85	2.82	1.83	6.93	3.18	65.31
Missouri	3.12	2.81	2.82	3.37	6.88	2.72	2.68	5.64	2.25	3.02	6.44	2.44	44.19
Montana	0.72	0.55	0.95	0.52	1.90	2.30	2.02	0.87	2.21	2.45	1.50	1.40	17.42
Nebraska	0.26	0.20	2.23	0.67	4.10	3.11	2.03	2.20	3.64	4.11	1.82	0.18	24.55
Nevada	0.40	0.35	1.57	0.40	0.92	0.07	1.00	0.42	0.31	1.69	1.77	0.80	9.70
New England	3.13	2.96	1.53	2.68	5.00	3.09	3.22	6.39	3.79	2.17	2.02	3.73	39.71
New Jersey	1.76	2.16	3.17	1.51	6.63	5.25	5.91	4.49	3.34	1.49	1.45	2.38	39.54
New Mexico	0.77	0.16	0.78	0.43	0.67	0.45	2.07	3.42	1.85	1.58	0.93	0.35	13.46
New York	1.75	2.55	1.65	1.84	5.11	3.77	3.76	3.65	3.79	3.52	2.31	3.16	36.86
North Carolina	4.56	3.98	3.45	3.89	5.48	3.73	7.06	4.38	3.91	3.60	2.86	2.06	48.96
North Dakota	0.20	0.66	0.99	0.67	1.60	3.06	2.17	1.62	2.52	2.23	0.35	0.53	16.60
Ohio	1.05	3.14	3.21	1.63	5.64	5.94	3.09	2.51	1.42	3.09	2.73	2.51	35.96
Oklahoma	2.82	2.52	2.21	2.85	5.92	3.00	0.84	3.06	2.08	2.03	5.42	2.81	35.56
Oregon	4.01	3.01	3.20	1.01	1.53	1.42	0.46	0.34	1.00	3.20	4.84	3.23	27.25
Pennsylvania	1.36	2.33	3.18	1.19	7.25	6.05	4.05	3.87	3.29	3.50	1.26	2.30	39.63
South Carolina	4.21	3.22	3.73	3.71	4.37	2.64	6.37	5.22	2.44	4.84	2.82	1.26	44.83
South Dakota	0.14	0.61	2.06	1.40	4.38	4.45	2.06	1.80	4.13	3.24	0.70	0.38	25.35
Tennessee	8.46	5.82	5.40	3.04	5.42	2.88	4.48	3.33	3.50	2.76	5.02	4.03	54.14
Texas	3.65	2.18	2.42	2.83	5.31	3.34	1.50	3.27	4.30	3.00	4.34	1.96	38.10
Utah	0.96	0.42	1.68	1.48	1.82	0.09	0.76	1.41	0.30	4.09	2.19	1.60	16.80
Virginia	3.10	2.77	2.82	2.64	6.16	3.30	5.08	3.43	2.98	2.62	1.76	2.13	38.79
Washington	5.50	4.68	3.79	2.37	1.02	3.05	0.65	0.42	1.37	3.82	5.22	5.57	37.46
West Virginia	2.38	3.23	3.62	1.99	5.11	5.27	3.20	2.75	2.27	2.67	1.67	2.44	36.60
Wisconsin	2.01	0.83	1.84	0.83	2.85	6.43	1.76	2.29	4.41	2.63	2.40	1.41	29.69
Wyoming	0.54	0.49	1.34	0.75	3.13	1.85	0.97	1.15	1.67	2.24	0.74	0.65	15.52

PRELIMINARY REPORT ON TORNADOES IN THE UNITED STATES DURING 1946

L. H. SEAMON

[Weather Bureau, Washington, D. C.]

The total number of tornadoes reported during 1946 was 114, which figure is 33 fewer than the average for the period 1916–45, and the smallest annual total since 1931, when only 94 occurred. Only 9 years during the last 33 have had fewer tornadoes than 1946. The greatest number usually occurs in May and 1946 was no exception to this rule; 35 occurred during this month, or 4 more than the average. During 1946 tornadoes were reported in 27 States; 11 occurred in each of the States of Kansas and Oklahoma, 13 in Texas, and 10 States reported only 1 each.

The total loss of life, 77, is relatively small when compared with the average of 237. In only 7 years since 1916 has the death toll been lower. More than a third of the deaths occurred in Texas during a series of tornadoes which struck the northeastern section of the State during January. Of the 114 tornadoes reported, only 20 were responsible for loss of life.

Total property damage was about $12,657,650, slightly more than in an average year; more than a third of this damage occurred during the month of May. Nearly three-quarters of the damage was done in the five States of Texas, Michigan, Oklahoma, Minnesota, and Missouri. Only occasionally are tornadoes reported which do no damage; two such were observed in Wyoming, each failing to touch the ground.

On January 4, the most disastrous tornado activity of the year was recorded when a series of tornadoes struck several areas of northeastern Texas. The first tornado struck near Decatur, injuring 8 people and destroying some farm property. At 8:30 p. m., a second tornado killed 3 persons, injured 50, and damaged property to the extent of $500,000 near Lufkin. This was thought to be the same tornado that struck near Nacogdoches at 9 p. m., killing 10 persons, injuring 200, and causing damage of $1,500,000. At the same time another tornado near Palestine killed 15 persons, injured 60, and caused property damage in excess of $500,000. Again at about 9 p. m., a tornado near Shiloh killed 2 persons and caused $100,000 property damage. Still another tornado struck near Peniel at about 9 p. m., injuring 17 persons and causing $50,000 damage.

Severe tornado activity occurred in Mississippi on January 5–6. On the 5th a tornado dipped to the ground a few miles northeast of Waynesboro, causing property damage to the extent of about $500. At about 6 p. m., on the 6th, tornadoes killed 6 people at Carrollton, 2 at Coila, 1 at Indianola, and 3 at Sunflower, all in Mississipi; a total of about 40 persons were injured. Damage was estimated at $247,000, of which $60,000 was to crops. On this same date a tornado killed 6 people in Chicot County, Ark., injured 50 and caused property damage in excess of $50,000.

At 3:15 p. m., on May 30, a tornado struck Creston, Iowa, damaging buildings over an area about 2 miles long and a quarter of a mile wide. Damage was estimated to be between $250,000 and $300,000; wind damage in rural areas totaled almost as much.

Another series of destructive tornadoes occurred in Missouri on May 23. Tornadoes occurred between 5 and 7 p. m., in Atchison, Andrew, Holt, and Nodaway Counties, injuring 4 persons and causing damage, mostly in rural areas, estimated at between $180,000 and $270,000. Between 6:30 p. m., and midnight, in La Fayette, Ray, and Carroll Counties, 13 persons were injured and damage estimated at $504,650 was caused by one or more tornadoes. Three storms were reported to have occurred very closely together in Carroll County. Between 6:25 p. m. and 6:40 p. m., a tornado in Jackson County caused $290,000 damage, killed 2 people, and injured one seriously. Between 7:30 p. m., and 7:38 p. m., a tornado in Platte County, near Barry, caused $5,000 damage.

One of the most outstanding tornadoes of the year occurred during the night of June 17 in the Detroit-Windsor area on the Canadian border. Fifty-five injuries and $1,000,000 damage were caused on the American side, 15 deaths and 49 injuries on the Canadian side. Later, on the same night, another tornado struck the outskirts of Ypsilanti, Mich., killing one person and causing minor damage. On June 27, a second tornado occurred in the Detroit area, injuring nine persons and causing property damage estimated at between $250,000 and $500,000.

Two other outstanding tornadoes occurred in Minnesota on August 17. These tornadoes were only 36 miles apart and occurred in connection with a cold front. The first struck in Blue Earth County near Mankato between 6:40 p. m. and 7 p. m. A tourist camp, consisting of 26 cabins and housing about 70 people, was destroyed. Six people were killed almost instantly and 37 were injured. The force of this storm was indicated by the amazing fact that a 27-ton road grader was picked up and hurled 100 feet. Altogether 11 people were killed in this storm and about 49 injured. Total damage was estimated at $225,000, of which $25,000 was to growing crops. The second tornado struck Wells in Fairbault County about 7:30 p. m. A Catholic parochial school and a church suffered severe damage and many other buildings were unroofed in the residential district. The business district suffered the greatest destruction, however, since every building there was damaged and some completely destroyed. A detailed report on these two tornadoes will be found in the August CLIMATOLOGICAL DATA for the State of Minnesota.

Though tornadoes seldom occur in the Northeastern States, two were reported from that section during 1946. The first of these occurred at Concord, N. H., at 11:15 a. m., on July 23; it caused one death and property damage estimated at $60,000. The second occurred near Niagara Falls, N. Y., between 11:30 a. m., and 12:15 p. m., on August 13. Damage amounted to $1,500.

Tornadoes for 1946 are summarized in table 1, which shows the approximate monthly and annual number of tornadoes by States, with the deaths, injuries, and property damage caused by them. Material for this report was derived from the MONTHLY WEATHER REVIEW and monthly CLIMATOLOGICAL DATA publications for various sections of the United States. A final and more complete report will appear in the UNITED STATES METEOROLOGICAL YEARBOOK for 1946.

TABLE 1.—*Tornadoes and probable tornadoes*

State*	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Alabama:													
Number					1								1
Deaths					0								0
Injuries					0								0
Damage ($×1,000)					10.0								10.0
Arkansas													
Number	1										1		2
Deaths	6										0		6
Injuries	50										0		50
Damage ($×1,000)	50.0										(1)		[2] 50.0
Colorado:													
Number							5						5
Deaths							0						0
Injuries							0						0
Damage ($×1,000)							40.0						40.0
Florida:													
Number	1	2	1				3						7
Deaths	0	0	0				0						0
Injuries	0	3	0				0						3
Damage ($×1,000)	(1)	7.0	10.0				16.5						[2] 33.5
Georgia:													
Number		1			1				1				3
Deaths		0			0				0				0
Injuries		0			0				0				0
Damage ($×1,000)		(2)			15.0				10.0				[2] 25.0
Illinois:													
Number					1								1
Deaths					1								1
Injuries					10								10
Damage ($×1,000)					100.0								100.0
Indiana:													
Number					3	1				1			5
Deaths					0	0				0			0
Injuries					4	0				0			4
Damage ($×1,000)					252.5	20.0				50.0			322.5
Iowa:													
Number					2	1		1					4
Deaths					0	0		0					0
Injuries					4	0		0					4
Damage ($×1,000)					600.0	40.0		(4)					[2] 640.0
Kansas:													
Number			1	1	7			1	1				11
Deaths			0	0	1			0	0				1
Injuries			0	0	0			0	0				0
Damage ($×1,000)			15.0	3.0	367.5			(3)	2.0				[2] 387.5
Kentucky:													
Number					1							1	2
Deaths					0							0	0
Injuries					2							(5)	[2] 2
Damage ($×1,000)					350.0							300.0	[2] 650.0
Louisiana:													
Number					1	1	2				2		6
Deaths					0	0	0				2		2
Injuries					0	0	0				3		3
Damage ($×1,000)					2.8	(3)	27.5				10.0		[2] 40.3
Michigan:													
Number						3			2				5
Deaths						0			0				0
Injuries						44			0				44
Damage ($×1,000)						1,500.0			350.0				1,850.0
Minnesota:													
Number						3		2					5
Deaths						0		11					11
Injuries						4		74					78
Damage ($×1,000)						572.0		92.5					1,497.0
Mississippi:													
Number	5		3								1		9
Deaths	12		0								0		12
Injuries	40		3								0		43
Damage ($×1,000)	247.5		275.0								100.0		622.5
Missouri:													
Number					6	1		1					8
Deaths					0	0		0					0
Injuries					18	0		0					18
Damage ($×1,000)					1,069.65	(6)		(7)					[2] 1,069.65
Montana:													
Number						3	2		1				6
Deaths						1	0		0				1
Injuries						1	0		4				5
Damage ($×1,000)						37.5	3.5		300.0				341.0
Nebraska:													
Number					1								1
Deaths					0								0
Injuries					2								2
Damage ($×1,000)					36.0								36.0
New Hampshire:													
Number							1						1
Deaths							1						1
Injuries							0						0
Damage ($×1,000)							60.0						60.0
New York:													
Number								1					1
Deaths								0					0
Injuries								0					0
Damage ($×1,000)								1.5					1.5
North Carolina:													
Number					1								1
Deaths					4								4
Injuries					22								22
Damage ($×1,000)					108.0								108.0
North Dakota:													
Number						2							2
Deaths						0							0
Injuries						4							4
Damage ($×1,000)						85.0							85.0

See footnotes at end of table.

TABLE 1.—*Tornadoes and probable tornadoes*—Continued

State*	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Ohio:													
Number					1								1
Deaths					0								0
Injuries					0								0
Damage ($×1,000)					40.0								40.0
Oklahoma:													
Number		2	1		6	1				1			11
Deaths		1	0		1	0				0			2
Injuries		15	0		2	0				0			17
Damage ($×1,000)		1,500.0	150.0		62.0	50.0				25.0			1,787.0
Pennsylvania:													
Number								1					1
Deaths								0					0
Injuries								0					0
Damage ($×1,000)								(2)					(2)
Texas:													
Number	6			3	4								13
Deaths	30			0	6								36
Injuries	335			0	2								337
Damage ($×1,000)	2,000.0			18.9	172.3								2,851.2
Wisconsin:													
Number									1				1
Deaths									0				0
Injuries									0				0
Damage ($×1,000)									10.0				10.0
Wyoming:													
Number							2						2
Deaths							0						0
Injuries							0						0
Damage ($×1,000)							0						0
United States:													
Number (†)	13	5	6	4	35	16	15	7	6	2	4	1	114
Deaths	48	1	0	0	13	1	1	11	0	0	2	0	77
Injuries	425	18	3	0	66	53	0	74	4	0	3	0	646
Damage ($×1,000)	2,957.5	1,507.0	450.0	21.9	3,185.75	2,304.5	147.5	926.5	672.0	75.0	110.0	300.0	12,657.65

* None reported for states not listed.
† Corrected for boundary-crossing tornadoes.
[1] Considerable.
[2] Additional damage or number not included.
[3] Slight.
[4] Few thousand.
[5] Several.
[6] Not reported.

NORTH ATLANTIC HURRICANES AND TROPICAL DISTURBANCES OF 1946

H. C. SUMNER

[Weather Bureau, Washington, D. C.]

The hurricane season of 1946 passed uneventfully without the loss of a single life in the United States and with property damage confined to less than 10 million dollars. Compared with $80,000,000 damage in 1945 and over $150,000,000 damage in 1944, this figure indicates the comparatively mild nature of the year's tropical storms by the time they reached the coast line of the United States. The total of six tropical disturbances detected in the North Atlantic area during the past season was below the seasonal average of 8.5, an average based on the last 20 years of record. A total of 53 official advisories and warnings were issued by the Weather Bureau for these 6 tropical disturbances.

Only once during the year was the coast line seriously threatened by a hurricane of major proportions. On October 7, aircraft reconnaissance indicated that a storm center, encircled by winds reaching velocities of 115 knots, was moving north-northeastward in the Gulf of Mexico towards the Tampa Bay area. This storm quickly lost intensity during its last few hours over the Gulf, however, and caused relatively little damage as it moved across the Florida Peninsula from Tampa to a point slightly west of Jacksonville.

Of the five other tropical disturbances, one moved across the North Carolina coast near Wilmington, one crossed the Bahamas and moved northeastward off the Atlantic coast into Newfoundland, and one reached the Texas coast west of Port Arthur. The fourth moved inland south of Tampico, Mexico; while the last, a minor disturbance, moved westward from the Bahamas and passed over the east Florida coast near Palm Beach.

For the fourth year aircraft reconnaissance played a major role in locating the centers of hurricanes and tropical disturbances as well as in determining their rate of forward movement and the wind velocities within their circulations. Knowledge of these factors is invaluable in issuing reliable warnings.

The following are reviews of all North Atlantic hurricanes and tropical disturbances that occurred during the 1946 season. A synopsis of the important features of these storms is given in table 2; their tracks, numbered I to VI chronologically, are plotted on Chart I.

I. *Weak tropical disturbance of June 14–16.*—This disturbance, accompanied by a small area of squally weather with winds of 25–35 miles per hour, was first detected near latitude 29.0° N., longitude 86.5° W., about 110 miles south of Valparaiso, Fla. The center moved west-northwestward during its 3-day life span, and passed inland on the Texas coast near Port Arthur on the 16th, attended by winds of gentle to moderate force. The highest wind velocity recorded was 36 miles per hour at Grand Isle, La., on June 15, at 1:30 a. m. No damage or loss of life was reported, although the sea was very rough in Mississippi Sound as the disturbance, traveling westward, moved across the Gulf to the south.

II. *Tropical disturbance of July 5–10.*—A small tropical disturbance moved north-northeastward along the coast of South Carolina during July 5, and at 6 a. m., on the 6th moved inland over North Carolina in the vicinity of Wilmington. At 5:50 a. m., on the 6th, during passage of the center over Wilmington, the barometer there reached a low of 29.71 inches (1,006.1 millibars). A maximum wind velocity of 30 miles per hour (with gusts estimated at 45 miles per hour) was recorded at Wilmington at 1 a. m., some 5 hours before passage of the center. Reports from Carolina and Wrightsville beaches indicate that winds reached 45 miles per hour (50–60 miles per hour in gusts) in that area.

Although there was some voluntary evacuation of beach property, little damage was reported to property of this type. In and near Wilmington wind damage was limited to plate-glass breakage and a short interruption of power and communication services. However, considerable crop damage (15 to 20 percent in some areas) resulted from the heavy rainfall.

As the storm moved seaward on July 6, between Cape Hatteras and Elizabeth City, N. C., it showed marked signs of greater intensity. During the next 4 days the center moved northeastward some distance off the coast and by the morning of the 10th reached a point southeast of Newfoundland.

III. *Minor tropical disturbance of August 25.*—Although the lack of a trade inversion over Swan Island, West Indies, during the several days previous indicated that conditions were favorable for the formation of a tropical disturbance in the vicinity, no development was detected until the morning of August 25, when reconnaissance flights located a well-defined circulation east of Tampico. The disturbance moved west-northwestward and passed inland a short distance south of Tampico, Mexico, dissipating rapidly during the night as it reached the mountains west of Tampico. No loss of life or property damage was reported.

IV. *Hurricane of September 12–15.*—On the 11th of September an area of falling pressure was noted over the Bahama Islands, with a minimum pressure over Andros Island. By 7:30 a. m., of the 12th there were evidences of a weak cyclonic circulation, and reconnaissance flights were arranged for the forenoon and afternoon. The afternoon flight located a definite center with an "eye" about 8 miles in diameter, surrounded by a 5-mile wide ring of winds with speeds up to 55 knots. At 4 p. m., of the 12th the area of high winds was about 20 miles in diameter, with the center located about 125 miles east of Miami, Fla., and 90 miles northwest of Nassau. The center passed over Great Abaco Island, Bahamas, about midnight. Hopetown reported a west wind of 65 miles per hour; gusts of higher velocity; and a low pressure at the center of 29.38 inches (994.9 millibars).

Continuing a northeastward movement over the Atlantic, the disturbance soon developed to full hurricane force. A reconnaissance plane flew into the center at about 1:30 p. m. of the 13th, near latitude 29.2° N., longtiude 73.8° W., and encountered winds of 85 to 90 knots. On this flight the central pressure was reported as 28.80 inches (975.3 millibars). Several hours earlier the *S. S. St. Cloud* was involved in the hurricane near latitude 28.7° N., longitude 74.8° W., and reported winds of 100 miles per

hour. During the 14th and 15th the forward movement of the storm increased at a rapid rate as it moved northeastward some distance off the Atlantic coast. It skirted Nova Scotia on the 15th and, diminishing in intensity, passed into Newfoundland accompanied by winds reduced to gale force.

V. *Florida hurricane of October 6–9.*—Late on October 5 a poorly defined cyclonic circulation passed northeastward from Guatemala into the Caribbean Sea. The forward movement of this low pressure area slowed to about 12 miles per hour as it moved out over the waters of the Caribbean, and between 1:30 p. m. of the 5th and 7:30 a, m. of the 6th, the central pressure fell from 1,005.0 millibars to 993.0 millibars, with winds increasing to over 50 miles per hour. During the late afternoon of the 6th winds of 85 miles per hour were measured from aircraft and surface vessels.

During the following night the center crossed extreme western Cuba, with the station at San Julian, Cuba, reporting gusts reaching 112 miles per hour. Moving into the Gulf, the center passed a short distance west of Dry Tortugas, which, at 12:30 p. m. on the 7th, recorded an extreme wind velocity of 84 miles per hour from the south. Several ships west of this island reported winds of 80–100 knots, and a reconnaissance plane flying into the center estimated a wind of 115 knots (132 miles per hour).

After passing the latitude of Dry Tortugas the storm began to lose intensity, as indicated by reports from a plane that flew into the storm at 4:18 p. m., while it was centered about 100 miles west-southwest of Fort Myers; no winds greater than 85 knots (98 miles per hour) were reported.

As the storm approached the Florida coast, the ring of hurricane-force winds, which probably never exceeded 50 miles in width, was destroyed at the surface, leaving a poorly defined and relatively flat central area surrounded by a broad circulation of gale-force winds. Some Florida stations directly in the path of the storm reported winds which gradually decreased from 40–50 miles per hour down to 15–20 miles per hour, and gradually increased again, without any relatively calm period intervening. Others reported a complete calm for periods of as long as 1 hour. No stations reported the rapid transition in wind conditions which is characteristic of the approach and passage of a hurricane "eye." However, a short distance above the surface, there seemed to be little disruption of the hurricane-force winds. Several stations reported very rapidly moving low clouds at the height of the storm, with only fresh surface winds; and one observer stated that while small trees were being gently swayed by the wind at the peak of the storm, the tops of taller pines in the same field were being violently twisted and sheared. Along the west Florida coast the maximum winds reported were 75 miles per hour. These high velocities were reported from stations to the right of the center of the storm, in the Fort Myers-Punta Gorda section. Tampa, over which the calm center passed about midnight, reported a highest wind of only 47 miles per hour.

The forward movement of the hurricane accelerated rapidly during the 7–8th, from about 14 miles per hour upon leaving Cuba to 33 miles per hour when passing over Florida and southeastern Georgia. Coming to an abrupt stop between Columbia, S. C., and Augusta, Ga., on the 8th, it continued to lose force. Heavy rains spread over the Carolinas and Virginia, with diminishing winds. After remaining stationary for about 18 hours, the weak low-pressure system moved over the North Carolina Capes into the Atlantic.

The greatest damage in Florida was to the citrus crop, and was estimated at 2 percent, or 2,000,000 boxes of fruit, at $2.50 per box, amounting to $5,000,000. In some west coast counties, such as Sarasota, Charlotte, and Lee, the loss ran to 10 percent for oranges and 15–20 percent for grapefruit, but the production in these counties is small compared to the total crop.

Other property damage was confined to about $200,000, most of which resulted from unusually high tides along the west Florida coast. The town of Everglades was inundated to depths ranging from 1½ to 3 feet. Parts of Punta Gorda and Fort Myers were also flooded, as were low beaches and islands from Tampa Bay to the Keys.

TABLE 1.— *Meteorological data for hurricane of Oct. 6–9, 1946*

[All times eastern standard]

Station	Date of observation	Lowest pressure reported (inches)[1]	Time of lowest pressure	Maximum wind velocity for a 5-minute period	Time of maximum velocity	Extreme wind velocity (fastest mile from register)	Time of extreme velocity	Velocity of extreme gust	Miscellaneous
Alligator Light, Fla.	7	29.60	2:30 p. m.	61 SE	8:57 a. m.	64 SE	9:00 a. m.		
Brunswick, Ga.	8	29.20	7:15 a. m.	39 SE	8:15 a. m.	40 S	8:45 a. m.	50 SE	Tide, +9.5 ft.
Carysfort Reef Light, Fla.	7	29.67	7:00 p. m.	51 SE	8:00 a. m.				Duration of gale winds, 13 hours.
Charleston, S. C.	8	29.39	2:30 p. m.	28 SSE	12:50 p. m.			55	
Cortez, Fla.	7	28.95	10:30 p. m.						Tide, +3.0 ft.
Daytona Beach, Fla.	8	29.33	3:00 a. m.			65 SSE	3:00 a. m.		Tide, +2.0 ft. Rain 2.32 inches.
Dry Tortugas, Fla.	7			80 S	12:30 p. m.	84 S	12:30 p. m.		Duration of gale winds, 29 hours.
Everglades, Fla.	7	29.55	7.00 p. m.						Tide, +5.0 ft. Rain, 0.72 inches.
Fort Myers, Fla.	7	29.31	9:15 p. m.			58 ESE	8:27 p. m.	80 SSE	Duration of gale winds, 5 hours.
Homestead, Fla.	7	29.51	6:00 p. m.	35 SE	6:00 p. m.	40 S	6:00 p. m.		Rain, 2.35 inches.
Jacksonville, Fla. (WBO)	8	29.21	5:50 a. m.	33 S	7:00 a. m.	33 S	7:01 a. m.		Rain, 2.56 inches.
Jacksonville, Fla. (WBAS)	8	29.21	5:50 a. m.			33 ESE	4:33 a. m.	60	
Key West, Fla.	7	29.50	4:00 p. m.	36 SW	7:39 p. m.	38 SW	7:33 p. m.		Tide normal. Rain, 2.01 inches.
Miami, Fla. (WBO)	7	29.61	7:30 p. m.	50 SE	7:23 a. m.	52 SE	7:23 a. m.		Duration of gale winds, 9 hours.
Miami, Fla. (WBAS)	7	29.59	5:26 p. m.			30 SSE	5:26 p. m.		
Ocala, Fla.	8	29.12	3:15 a. m.						Rain, 6. 20 inches.
Okeechobee, Fla.	7	29.53	12:00 mid.	50 SSE	8:45 p. m.	64 SSE	8:45 p. m.		Duration of gale winds, 3.5 hours.
Punta Gorda, Fla.	7	29.16	10:00 p. m.	55 SSE	11:00 p. m.	75 SSE	11:00 p. m.		Tide, +6.0 ft. Rain, 1.06 inches.
St. Petersburg, Fla.	7	29.16	11:50 p. m.	48 NE	10:00 p. m.	62 NE	10:00 p. m.		Duration of gale winds, 4 hours.
Savannah, Ga.	8	29.21	11:15 a. m.	42 S	12:52 p. m.	48 S	1:53 p. m.	55	Rain, 4.25 inches.
Tampa, Fla.	8	29.14	12:30 a. m.	33 W	11:10 a. m.	47 W	11:10 a. m.[2]		Tide, +3.4 ft. Rain, 2.21 inches.
West Palm Beach, Fla.	7	29.60	8:28 p. m.			32 SSE	4:16 p. m.		Rain, 3.09 inches.
Reported extremes		28.95		80 S		84 S		80 SSE	

[1] Reduced to sea level.
[2] Also 47 miles per hour from the northeast on October 7, at 10 p. m.

NOTE.—Under column "velocity of extreme gust," where no direction is given, this direction was not reported.

Slight damage was reported along the Atlantic coast from Titusville, Fla., to Charleston, S. C., mostly from high tides.

No loss of life or serious injury was reported for the Gulf or Atlantic coasts of the United States. However, press reports stated that 5 lives were lost as a result of this hurricane in western Cuba.

A tabular listing of the lowest pressures and the highest wind velocities observed at selected stations during this Florida hurricane is contained in table 1.

VI. *Minor disturbance of October 31–November 2.*—This disturbance developed from a wave formation in the pressure field which was noted moving westward north of Puerto Rico and Hispaniola on October 31. Early on November 1, a rather concentrated fall in pressure was noted as the wave moved through the Bahama Islands. During the morning, aircraft reconnaissance located signs of a forming cyclonic circulation, which was, however, still weak and poorly defined. The highest wind reported from the Bahamas area was Beaufort force 8 (39-46 miles per hour) at West End, Grand Bahama Island, and aboard two ships north of that island.

From the Bahamas the center moved northwestward and passed over the Florida coast near Palm Beach at about 4:30 p. m. on the 1st of November. Wind velocities over Florida at no time exceeded 40 miles per hour, although squalls and winds between 30 and 40 miles per hour were reported from near Miami to Daytona Beach.

Moving more slowly and continuing a northwestward movement, the center reached a location between Lakeland and Orlando, Fla., by 7:30 a. m. on November 2. Thereafter the disturbance deteriorated rapidly, with the remnants finally drifting into the Atlantic near Jacksonville.

In Florida no wind damage occurred, but heavy rains that accompanied the disturbance flooded crops from Lake Okeechobee to the coast, with damage amounting to 50–75 percent of early fall plantings.

TABLE 2.—*North Atlantic hurricanes and tropical disturbances of 1946*

[Number of storm in table corresponds to number of track on Chart I]

Storm	Date	Area where first reported	Coast lines crossed	Maximum wind speed reported	Lowest pressure reported [1]	Place of dissipation	Intensity	Remarks
I	June 14-16	About 110 miles south of Valparaiso, Fla.	Louisiana and Texas.	36 miles per hour at Grand Isle, La.	No data	Extreme southeastern portion of Texas.	Weak disturbance.	No loss of life or damage reported.
II	July 5-10	Off the South Carolina coast.	North Carolina.	30 miles per hour, and estimated gusts of 45 miles per hour at Wilmington, N. C.	1,006.1 millibars (29.71 inches) at Wilmington, N. C.	Atlantic Ocean east of Newfoundland.	About hurricane intensity over the Atlantic.	Minor damage to beach property near Wilmington, N. C.
III	Aug. 25	Southwest Gulf of Mexico.	Mexico	No data	No data	Interior of Vera Cruz.	Not of hurricane intensity.	No loss of life or damage has been reported.
IV	Sept. 12-15	Near Andros Island, Bahamas.	None	100 miles per hour estimated, S. S. *St. Cloud* at 28.7° N. latitude, 74.8° W. longitude.	975.3 millibars (28.80 inches), reconnaissance plane at 29.2° N., latitude, 73.8° W. longitude.	Southern Newfoundland.	Full hurricane	The Norwegian tanker *Marit II* was reported broken in half and sunk, with a loss of sixteen lives, but, since the area of hurricane winds was not closer than 300 miles at the time, the loss cannot be directly attributed to the hurricane.
V	Oct. 6-9	Northwestern Caribbean Sea, south of the Yucatan Channel.	Cuba, Florida, and North Carolina.	115 knots (132 miles per hour) estimated from a reconnaissance plane near 24.1°N., latitude; 83.6° W. longitude.	978.7 millibars (28.90 inches), reconnaissance plane near 26.1° N. latitude, 83.7° W. longitude.	At sea off the North Carolina coast.	do	No loss of life in the United States; 5 killed in Cuba. Damage in Florida estimated at $5,200,000.
VI	Oct. 31-Nov. 2.	Atlantic Ocean north of Hispaniola.	Florida	Beaufort force 8 (39-46 miles per hour) at West End, Grand Bahama Island.	No data available for Bahama Islands.	At sea off the South Carolina coast.	Minor disturbance.	No winds over 40 miles per hour in Florida. Several million dollars damage to fall plantings from heavy rains.

[1] Reduced to sea level.

METEOROLOGICAL AND CLIMATOLOGICAL DATA FOR DECEMBER 1946

AEROLOGICAL OBSERVATIONS

[For description of change in Table 1 and charts, see REVIEW, January 1946, p. 6]

TABLE 1.—*Mean dynamic height (geopotential) in units of 0.98 dynamic meters, temperature in degrees centigrade, and relative humidity in percent, for standard pressures, as obtained by radiosondes during December 1946*

STATIONS AND MEAN SURFACE PRESSURES

Standard pressure surface (mb.)	Albany, N. Y. (1,006.8 mb.)				Albuquerque, N. Mex. (838.7 mb.)				Apalachicola, Fla. (1,020.6 mb.)				Atlanta, Ga. (986.2 mb.)				Auburn, Calif. (959.0 mb.)				Big Spring, Tex. (929.7 mb.)				Bismarck, N. Dak. (955.7 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	88	−2.3	76	31	1,620	6.0	40	30	5	13.6	84	31	300	7.2	71	31	501	6.9	83	30	774	9.0	87	30	505	−8.7	84
1,000	31	139	(*)	----	31	150	(*)	----	30	178	15.4	72	31	183	(*)	----	31	154	(*)	----	30	159	(*)	----	30	149	(*)	----
950	31	550	−3.5	77	31	589	(*)	----	30	618	13.9	63	31	614	9.2	63	31	584	8.4	77	30	591	(*)	----	30	551	(*)	----
900	31	971	−5.1	77	31	1,041	(*)	----	30	1,067	12.4	51	31	1,057	8.6	60	30	1,027	8.9	52	30	1,044	11.1	46	30	970	−7.1	76
850	31	1,419	−6.2	74	31	1,509	(*)	----	30	1,543	10.7	45	31	1,529	7.7	47	30	1,499	7.1	45	30	1,530	9.9	41	30	1,417	−5.9	62
800	31	1,892	−7.6	71	31	2,007	5.7	39	30	2,048	9.4	33	31	2,027	6.2	42	30	1,995	4.6	43	30	2,021	7.9	39	30	1,892	−6.4	61
750	31	2,398	−9.0	67	31	2,536	2.9	41	30	2,586	7.2	----	31	2,561	4.3	33	30	2,524	1.0	45	30	2,553	6.0	31	30	2,396	−8.6	60
700	31	2,924	−11.1	56	31	3,088	−0.3	43	30	3,144	4.2	----	31	3,112	1.6	34	30	3,069	−2.3	42	30	3,113	3.1	29	30	2,927	−11.1	55
650	31	3,500	−13.9	53	31	3,680	−3.8	45	30	3,742	0.5	----	31	3,708	−1.9	----	30	3,658	−5.8	----	30	3,712	−0.2	----	29	3,498	−14.9	62
600	30	4,098	−16.7	54	31	4,304	−7.2	42	30	4,379	−3.4	----	31	4,338	−5.5	----	30	4,275	−10.0	----	30	4,346	−4.2	----	29	4,096	−18.0	59
550	30	4,753	−19.5	54	31	4,978	−11.2	38	30	5,061	−7.4	----	31	5,018	−9.7	----	30	4,942	−14.4	----	29	5,027	−8.5	----	29	4,742	−21.9	----
500	29	5,452	−23.7	----	31	5,702	−15.8	43	30	5,797	−12.2	----	30	5,744	−14.4	----	30	5,656	−19.4	----	29	5,761	−13.2	----	29	5,437	−26.2	----
450	28	6,214	−28.7	----	30	6,500	−21.1	----	30	6,600	−17.5	----	30	6,539	−19.7	----	29	6,433	−23.5	----	29	6,560	−18.7	----	28	6,201	−31.0	----
400	28	7,040	−33.7	----	30	7,354	−27.2	----	30	7,452	−23.5	----	30	7,398	−25.9	----	28	7,267	−31.5	----	29	7,422	−25.2	----	28	7,022	−36.6	----
350	28	7,964	−40.0	----	30	8,301	−34.5	----	30	8,426	−30.7	----	30	8,398	−32.8	----	28	8,197	−38.8	----	27	8,380	−32.1	----	24	7,968	−42.0	----
300	27	9,013	−46.6	----	30	9,357	−42.5	----	29	9,503	−38.8	----	30	9,418	−40.9	----	28	9,236	−46.6	----	23	9,438	−39.8	----	23	8,992	−48.9	----
250	27	10,205	−53.3	----	28	10,568	−51.3	----	29	10,729	−47.9	----	30	10,633	−49.9	----	28	10,426	−53.6	----	18	10,668	−49.0	----	15	10,175	−53.9	----
200	19	11,619	−57.9	----	21	11,971	−58.7	----	28	12,168	−57.8	----	29	12,057	−58.3	----	25	11,844	−58.4	----	11	12,123	−57.6	----	7	11,591	−53.2	----
175	13	12,445	−56.7	----	13	12,831	−59.6	----	26	13,002	−61.9	----	28	12,894	−61.2	----	24	12,673	−59.0	----								
150	10	13,402	−55.4	----	8	13,771	−61.9	----	23	13,947	−64.7	----	23	13,838	−63.4	----	19	13,641	−59.6	----								
125	6	14,585	−54.7	----					17	15,061	−67.6	----	14	14,947	−65.2	----	12	14,754	−60.0	----								
100									10	16,390	−71.4	----																

Standard pressure surface (mb.)	Boise, Idaho (919.1 mb.)				Brownsville, Tex. (1,017.6 mb.)				Buffalo, N. Y. (990.0 mb.)				Caribou, Maine (990.4 mb.)				Charleston, S. C. (1,019.8 mb.)				Ciudad Victoria, Mexico, (978.0 mb.)				Columbia, Mo. (990.5 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	868	2.2	76	31	6	16.8	86	31	221	−0.8	74	31	191	−10.3	88	31	14	9.4	81	31	335	19.2	61	31	239	4.0	68
1,000	31	179	(*)	----	31	154	17.2	83	31	139	(*)	----	31	115	(*)	----	31	177	12.7	70	31	141	(*)	----	31	159	(*)	----
950	31	604	(*)	----	31	597	15.7	78	31	552	−2.2	73	31	517	(*)	----	31	612	12.1	58	31	584	18.4	59	31	585	3.9	65
900	31	1,037	3.4	69	31	1,051	14.7	62	31	976	−4.4	79	31	926	−11.5	82	31	1,060	10.6	54	31	1,046	15.5	62	31	1,016	3.3	61
850	31	1,500	1.7	65	31	1,533	13.3	51	31	1,425	−5.8	76	31	1,363	−12.0	77	31	1,536	9.2	46	28	1,529	13.1	64	31	1,478	1.9	57
800	31	1,986	−1.0	68	31	2,042	11.8	43	31	1,899	−7.1	66	31	1,827	−12.8	69	31	2,037	7.5	38	28	2,037	11.3	61	31	1,967	1.2	50
750	31	2,505	−3.6	65	31	2,586	9.5	37	31	2,409	−8.9	55	31	2,324	−14.2	65	31	2,570	5.0	36	28	2,580	9.1	55	31	2,491	−0.7	43
700	31	3,042	−6.1	60	31	3,150	6.8	32	31	2,933	−10.5	51	31	2,839	−15.7	61	31	3,126	2.0	33	28	3,144	6.2	50	31	3,033	−3.2	39
650	31	3,624	−9.4	55	29	3,756	3.2	29	31	3,510	−13.2	50	31	3,404	−17.9	58	29	3,722	−1.5	34	27	3,750	2.6	46	31	3,622	−6.4	43
600	31	4,233	−12.8	51	29	4,397	−1.1	29	31	4,107	−16.5	49	31	3,991	−20.8	53	29	4,358	−5.3	31	27	4,391	−1.2	40	31	4,238	−9.9	39
550	31	4,895	−16.7	50	29	5,088	−5.1	29	31	4,760	−20.3	50	31	4,633	−24.2	----	28	5,032	−9.3	----	26	5,078	−5.2	41	31	4,909	−13.9	39
500	30	5,602	−20.8	56	28	5,827	−9.7	32	31	5,456	−24.6	----	30	5,310	−28.6	----	28	5,762	−14.2	----	23	5,823	−9.6	----	31	5,622	−18.6	40
450	29	6,374	−26.6	----	28	6,641	−15.2	42	27	6,219	−29.7	----	29	6,063	−33.3	----	28	6,560	−19.5	----	17	6,634	−15.0	----	29	6,406	−23.8	----
400	27	7,222	−32.3	----	26	7,520	−21.1	----	26	7,051	−34.7	----	28	6,871	−38.5	----	27	7,416	−26.1	----	15	7,515	−21.5	----	29	7,247	−29.8	----
350	24	8,141	−40.0	----	25	8,485	−28.3	----	26	7,971	−40.7	----	28	7,777	−43.8	----	27	8,368	−33.0	----	10	8,485	−28.5	----	28	8,197	−36.2	----
300	23	9,176	−48.1	----	25	9,571	−36.3	----	22	9,028	−46.2	----	27	8,790	−48.6	----	25	9,439	−40.6	----	7	9,575	−36.7	----	27	9,255	−44.1	----
250	22	10,366	−55.7	----	23	10,810	−45.3	----	15	10,241	−52.0	----	26	9,978	−52.2	----	24	10,660	−50.0	----	7	10,812	−46.4	----	25	10,462	−52.6	----
200	17	11,776	−60.9	----	21	12,267	−55.1	----	11	11,671	−55.4	----	22	11,413	−52.3	----	23	12,094	−58.8	----	6	12,251	−58.3	----	20	11,886	−58.7	----
175	10	12,552	−59.9	----	16	13,120	−59.5	----	6	12,474	−54.1	----	15	12,267	−51.5	----	21	12,928	−61.6	----	5	13,084	−63.1	----	11	12,774	−61.1	----
150	9	13,508	−58.7	----	7	14,060	−61.8	----	5	13,444	−53.8	----	9	13,270	−51.3	----	19	13,871	−63.7	----					5	13,722	−61.7	----
125													6	14,424	−53.2	----	15	14,980	−66.4	----								

Standard pressure surface (mb.)	Dodge City, Kans. (926.0 mb.)				El Paso, Tex. (883.2 mb.)				Ely, Nev. (809.8 mb.)				Fort Worth, Tex. (994.0 mb.)				Glasgow, Mont. (939.1 mb.)				Grand Junction, Colo. (854.9 mb.)				Great Falls, Mont. (884.4 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	787	2.3	68	31	1,195	8.6	49	31	1,908	−1.3	80	31	211	11.2	68	31	648	−9.2	86	31	1,474	0.5	70	31	1,128	−2.9	68
1,000	31	154	(*)	----	31	149	(*)	----	31	186	(*)	----	31	159	(*)	----	31	154	(*)	----	31	192	(*)	----	31	141	(*)	----
950	31	577	(*)	----	31	591	(*)	----	31	613	(*)	----	31	593	11.2	60	31	559	(*)	----	31	623	(*)	----	31	562	(*)	----
900	31	1,018	5.9	54	31	1,045	(*)	----	31	1,055	(*)	----	31	1,040	10.1	54	31	978	−5.8	79	31	1,065	(*)	----	31	994	(*)	----
850	31	1,486	6.0	39	31	1,514	10.4	39	31	1,518	(*)	----	31	1,515	9.2	48	31	1,427	−5.2	68	31	1,521	(*)	----	31	1,443	−1.3	57
800	31	1,981	4.1	36	31	2,015	7.3	43	31	2,005	0.6	71	31	2,016	7.5	40	31	1,903	−6.5	67	31	2,008	0.6	56	31	1,925	−3.3	58
750	31	2,508	1.5	38	31	2,550	5.3	36	31	2,529	−0.8	58	31	2,550	5.5	37	31	2,408	−9.1	70	31	2,529	−1.5	56	31	2,437	−5.9	60
700	31	3,056	−1.0	33	31	3,105	2.1	35	31	3,071	−3.3	52	31	3,106	2.7	32	31	2,936	−11.8	73	31	3,071	−4.6	59	31	2,971	−8.7	62
650	31	3,646	−4.4	32	31	3,702	−1.0	32	31	3,657	−6.4	53	31	3,705	−0.6	----	31	3,505	−15.0	72	31	3,653	−8.0	60	31	3,548	−12.1	60
600	31	4,268	−8.5	35	31	4,333	−5.0	31	31	4,276	−9.9	54	30	4,338	−4.3	----	31	4,101	−18.4	68	31	4,269	−11.8	63	31	4,150	−15.7	56
550	30	4,941	−13.1	37	31	5,014	−9.3	33	31	4,942	−14.3	52	30	5,019	−8.6	----	31	4,747	−22.3	----	30	4,932	−15.6	61	31	4,804	−19.9	54
500	30	5,660	−17.8	43	31	5,742	−14.6	----	31	5,658	−19.1	42	28	5,746	−13.6	----	31	5,441	−26.4	----	30	5,644	−20.1	66	31	5,501	−24.7	----
450	30	6,448	−23.1	----	30	6,546	−20.2	----	31	6,443	−24.5	----	27	6,543	−19.2	----	31	6,198	−31.5	----	29	6,420	−25.4	----	31	6,265	−30.1	----
400	30	7,296	−29.1	----	30	7,400	−26.4	----	30	7,277	−31.0	----	27	7,403	−25.6	----	30	7,025	−37.3	----	28	7,257	−31.3	----	30	7,090	−36.3	----
350	30	8,233	−36.2	----	30	8,350	−33.8	----	29	8,210	−37.5	----	27	8,357	−32.9	----	30	7,933	−43.9	----	25	8,203	−37.3	----	30	8,003	−43.1	----
300	30	9,284	−43.7	----	30	9,412	−41.8	----	29	9,257	−45.1	----	26	9,423	−41.0	----	27	8,939	−51.3	----	24	9,250	−45.2	----	29	9,023	−50.5	----
250	30	10,485	−52.1	----	29	10,618	−51.1	----	28	10,459	−53.3	----	24	10,633	−50.0	----	22	10,092	−56.4	----	24	10,445	−53.0	----	27	10,202	−56.6	----
200	28	11,917	−58.8	----	26	12,051	−58.6	----	24	11,867	−59.3	----	18	12,078	−58.0	----	8	11,508	−56.0	----	13	11,832	−57.4	----	11	11,640	−59.4	----
175	24	12,766	−60.6	----	13	12,843	−59.8	----	19	12,723	−60.2	----	13	12,907	−61.1	----					9	12,680	−57.8	----				
150	16	13,718	−60.8	----					15	13,665	−60.5	----	7	13,851	−62.3	----												
125	5	14,829	−62.7	----					10	14,793	−60.3	----																

See footnotes at end of table.

TABLE 1.—*Mean dynamic height (geopotential) in units of 0.98 dynamic meters, temperature in degrees centigrade, and relative humidity in percent, for standard pressures, as obtained by radiosondes during December 1946*—Continued

Standard pressure surface (mb.)	Greensboro, N. C. (988.6 mb.)				Hatteras, N. C. (1,020.3 mb.)				Havana, Cuba (1,011.1 mb.)				Honolulu, T. H. (1,011.2 mb.)				Huntington, W. Va. (1,000.4 mb.)				International Falls, Minn. (973.7 mb.)				Joliet, Ill. (996.7 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	273	5.3	73	31	3	11.7	81	18	50	22.6	89	31	3	23.9	70	29	172	2.4	73	31	360	−13.0	85	31	178	−0.2	80
1,000	31	177	(*)	----	31	171	12.2	71	18	146	22.4	87	31	100	22.7	71	29	174	(*)	----	31	154	(*)	----	31	150	(*)	----
950	31	603	6.9	60	31	601	10.6	63	18	596	19.4	85	31	550	19.2	75	29	596	3.5	61	31	549	−13.8	89	31	562	−0.7	74
900	31	1,043	5.8	56	31	1,049	8.8	57	18	1,056	16.3	87	31	1,008	15.9	77	28	1,027	0.8	66	31	956	−13.3	82	31	992	−1.5	66
850	31	1,510	4.2	53	31	1,521	7.0	51	18	1,542	13.4	84	31	1,492	12.7	78	28	1,485	−0.5	63	31	1,392	−12.4	70	31	1,446	−2.3	61
800	31	2,002	2.8	46	31	2,017	4.8	46	18	2,062	10.8	70	31	2,000	10.1	72	28	1,969	−1.5	55	31	1,855	−12.3	64	31	1,926	−3.7	60
750	31	2,529	1.0	45	31	2,546	2.9	38	18	2,593	9.3	----	31	2,541	8.1	53	27	2,483	−2.9	51	31	2,353	−13.6	56	31	2,439	−5.2	56
700	31	3,074	−1.9	44	31	3,097	0.0	32	18	3,158	6.2	----	31	3,102	5.3	45	27	3,024	−5.6	53	31	2,869	−15.7	47	31	2,975	−7.5	59
650	30	3,663	−4.9	42	31	3,689	−3.1	----	18	3,764	2.8	----	29	3,707	2.1	35	27	3,606	−8.2	51	31	3,433	−18.2	48	31	3,555	−10.4	56
600	30	4,287	−8.7	44	31	4,316	−6.8	----	18	4,406	−0.7	----	29	4,346	−1.7	33	26	4,228	−11.2	----	30	4,023	−21.8	----	31	4,162	−13.7	54
550	30	4,958	−12.5	45	31	4,992	−11.0	----	18	5,097	−4.7	----	29	5,035	−5.9	33	25	4,882	−15.3	----	30	4,659	−25.2	----	31	4,819	−17.8	55
500	30	5,679	−17.1	47	31	5,715	−15.7	----	18	5,840	−9.1	----	29	5,773	−10.8	35	25	5,596	−19.5	----	29	5,355	−29.0	----	31	5,525	−22.2	----
450	29	6,470	−22.4	----	31	6,504	−20.9	----	18	6,652	−14.4	----	28	6,582	−16.5	----	25	6,377	−24.6	----	29	6,108	−33.8	----	31	6,297	−27.0	----
400	29	7,319	−28.3	----	29	7,360	−26.9	----	18	7,531	−20.6	----	27	7,450	−22.6	----	24	7,214	−30.6	----	28	6,926	−39.6	----	31	7,133	−32.7	----
350	28	8,260	−34.9	----	29	8,308	−34.2	----	16	8,500	−27.8	----	27	8,416	−29.2	----	22	8,152	−37.0	----	28	7,826	−46.0	----	31	8,060	−39.3	----
300	28	9,317	−43.4	----	28	9,370	−41.8	----	16	9,588	−36.2	----	27	9,502	−36.2	----	18	9,213	−44.4	----	26	8,828	−51.6	----	29	9,109	−46.2	----
250	27	10,523	−52.1	----	27	10,587	−50.7	----	13	10,827	−46.1	----	25	10,744	−44.9	----	17	10,409	−51.8	----	18	9,986	−53.4	----	27	10,319	−52.7	----
200	25	11,949	−59.8	----	20	11,996	−58.1	----	8	12,292	−56.2	----	16	12,211	−53.1	----	11	11,847	−58.4	----	8	11,465	−52.3	----	23	11,737	−58.5	----
175	22	12,785	−62.6	----	16	12,840	−59.9	----					12	13,062	−58.3	----	8	12,651	−59.6	----	7	12,304	−50.3	----	18	12,595	−57.6	----
150	16	13,739	−62.1	----	8	13,773	−59.5	----																	15	13,568	−57.3	----
125	5	14,896	−63.8	----																					5	14,710	−57.0	----

	Lake Charles, La. (1,019.7 mb.)				Lander, Wyo. (827.1 mb.)				Las Vegas, Nev. (951.3 mb.)				Little Rock, Ark. (1,011.1 mb.)				Mazatlan, Mexico (1,010.1 mb.)				Medford, Oreg. (972.1 mb.)				Merida, Mexico (1,012.8 mb.)			
Surface	30	5	12.6	84	31	1,696	−1.3	66	31	574	9.3	52	30	79	9.0	78	31	14	22.5	73	31	401	4.5	87	31	27	23.7	76
1,000	30	169	14.7	76	31	147	(*)	----	31	155	(*)	----	30	169	9.8	72	31	101	22.8	66	31	168	(*)	----	31	138	23.3	76
950	30	611	12.6	68	31	575	(*)	----	31	586	(*)	----	30	597	9.0	70	31	554	23.4	43	31	594	5.3	79	31	587	20.6	73
900	30	1,057	12.2	60	31	1,015	(*)	----	31	1,037	10.7	40	30	1,042	7.5	65	31	1,019	20.8	39	31	1,030	5.1	69	31	1,051	18.8	74
850	30	1,535	11.1	51	31	1,474	(*)	----	31	1,511	8.1	39	30	1,513	7.0	51	31	1,510	17.6	40	31	1,495	2.8	69	31	1,538	14.4	76
800	30	2,040	10.0	38	31	1,962	1.1	49	31	2,009	5.3	39	30	2,009	5.5	47	31	2,026	13.9	42	31	1,983	.1	69	31	2,048	12.0	61
750	30	2,578	7.8	34	31	2,485	−1.6	47	31	2,538	2.4	39	30	2,540	3.2	43	31	2,569	9.8	46	31	2,504	−2.1	58	31	2,591	10.1	46
700	30	3,140	4.9	----	31	3,025	−4.7	48	31	3,089	−.1	39	30	3,092	.9	38	31	3,136	5.8	49	31	3,044	−4.8	51	31	3,159	7.7	39
650	29	3,743	1.1	----	31	3,607	−8.7	52	31	3,679	−4.0	40	29	3,686	−2.2	30	27	3,744	2.1	48	31	3,626	−7.9	48	31	3,767	4.5	----
600	29	4,381	−3.0	----	31	4,220	−12.5	51	31	4,305	−8.1	44	29	4,314	−6.0	34	26	4,385	−1.8	47	31	4,241	−11.6	46	31	4,414	.7	----
550	29	5,066	−7.3	----	31	4,885	−16.4	53	31	4,978	−12.7	46	29	4,993	−10.2	----	25	5,072	−5.9	----	31	4,902	−15.7	48	30	5,105	−3.6	----
500	29	5,800	−12.1	----	31	5,590	−21.0	----	31	5,697	−17.3	49	29	5,718	−14.9	----	25	5,814	−10.4	----	31	5,614	−20.8	52	30	5,853	−8.1	----
450	29	6,604	−17.7	----	31	6,366	−26.8	----	31	6,482	−22.8	----	29	6,513	−20.1	----	23	6,619	−15.9	----	31	6,387	−26.6	----	30	6,671	−13.4	----
400	29	7,469	−23.8	----	31	7,198	−33.3	----	30	7,329	−29.2	----	29	7,369	−26.5	----	23	7,495	−22.0	----	30	7,219	−32.8	----	30	7,550	−19.7	----
350	27	8,434	−30.5	----	30	8,123	−40.4	----	30	8,269	−36.3	----	29	8,319	−33.5	----	18	8,465	−29.2	----	30	8,145	−39.7	----	29	8,526	−27.5	----
300	26	9,518	−38.3	----	30	9,155	−48.4	----	29	9,327	−44.0	----	29	9,383	−41.6	----	14	9,558	−37.2	----	30	9,181	−47.4	----	28	9,615	−36.2	----
250	25	10,751	−46.9	----	27	10,348	−55.5	----	27	10,535	−52.4	----	29	10,595	−50.5	----	13	10,793	−46.1	----	30	10,364	−55.4	----	26	10,859	−45.6	----
200	21	12,194	−55.3	----	21	11,787	−60.9	----	24	11,965	−58.8	----	24	12,024	−59.2	----	8	12,243	−56.2	----	29	11,765	−60.1	----	25	12,308	−56.5	----
175	19	13,030	−59.2	----	9	12,596	−60.5	----	19	12,804	−59.8	----	19	12,871	−61.9	----					25	12,599	−59.4	----	25	13,144	−61.7	----
150	12	13,993	−62.1	----	5	13,499	−59.1	----	14	13,762	−60.6	----	6	13,873	−62.3	----					11	13,552	−59.4	----	16	14,080	−66.7	----
125																					8	14,698	−59.2	----	5	15,187	−72.7	----

	Miami, Fla. (1,018.1 mb.)				Nantucket, Mass. (1,016.1 mb.)				Nashville, Tenn. (999.2 mb.)				New Orleans, La.[1] (..... mb.)				North Platte, Nebr. (918.1 mb.)				Oakland, Calif.[2] (1,017.9 mb.)				Ogden, Utah (866.5 mb.)			
Surface	31	4	20.7	86	31	14	3.3	73	31	180	7.9	68	----	----	----	----	31	849	−2.4	75	26	6	8.8	79	31	1,355	1.6	76
1,000	31	159	21.3	83	31	142	3.0	69	31	173	(*)	----	----	----	----	----	31	158	(*)	----	30	153	9.7	75	31	182	(*)	----
950	31	605	18.6	84	31	560	1.2	67	31	600	7.4	66	----	----	----	----	31	576	(*)	----	30	586	8.8	68	31	610	(*)	----
900	31	1,066	15.6	84	31	990	−.8	66	31	1,040	5.9	65	----	----	----	----	31	1,007	1.2	63	30	1,026	8.6	54	31	1,050	(*)	----
850	31	1,550	12.8	77	31	1,445	−2.2	58	31	1,507	4.8	58	----	----	----	----	31	1,468	1.4	49	30	1,498	7.7	46	31	1,510	2.6	68
800	31	2,057	10.8	61	31	1,925	−3.9	58	31	2,000	3.5	53	----	----	----	----	31	1,955	.4	47	30	1,995	5.4	40	31	1,999	.6	59
750	31	2,599	8.7	48	31	2,439	−5.0	50	31	2,529	1.3	51	----	----	----	----	31	2,477	−2.3	49	30	2,524	2.7	39	31	2,517	−2.5	62
700	30	3,162	6.1	41	31	2,972	−7.5	49	31	3,074	−1.2	48	----	----	----	----	31	3,015	−5.2	48	30	3,075	−.6	----	31	3,059	−5.8	63
650	29	3,768	3.1	34	30	3,549	−10.1	51	30	3,669	−4.0	45	----	----	----	----	31	3,599	−9.1	54	30	3,668	−4.0	----	31	3,639	−8.6	62
600	29	4,410	−.7	35	30	4,154	−13.4	45	29	4,293	−7.4	----	----	----	----	----	31	4,209	−12.5	52	30	4,290	−8.1	----	31	4,253	−12.0	61
550	29	5,098	−4.9	----	30	4,814	−17.0	----	27	4,969	−11.7	----	----	----	----	----	31	4,872	−16.8	55	29	4,969	−12.3	----	31	4,916	−15.8	58
500	29	5,843	−9.5	----	30	5,521	−21.4	----	26	5,694	−16.4	----	----	----	----	----	31	5,578	−21.3	----	29	5,688	−17.3	----	31	5,626	−20.4	58
450	29	6,657	−14.8	----	30	6,297	−26.5	----	26	6,488	−21.5	----	----	----	----	----	31	6,356	−26.3	----	28	6,470	−22.9	----	31	6,400	−26.0	----
400	28	7,532	−21.0	----	30	7,130	−31.9	----	25	7,346	−27.4	----	----	----	----	----	31	7,189	−32.4	----	28	7,319	−29.0	----	30	7,240	−31.9	----
350	28	8,503	−28.5	----	30	8,062	−38.0	----	24	8,302	−34.3	----	----	----	----	----	31	8,118	−39.0	----	28	8,260	−35.3	----	30	8,169	−39.2	----
300	27	9,590	−36.8	----	30	9,107	−44.8	----	20	9,366	−42.1	----	----	----	----	----	30	9,166	−46.1	----	26	9,313	−43.6	----	30	9,206	−47.1	----
250	27	10,828	−45.7	----	30	10,307	−51.5	----	16	10,568	−51.3	----	----	----	----	----	30	10,357	−53.6	----	23	10,518	−51.0	----	29	10,393	−54.4	----
200	25	12,282	−55.3	----	26	11,741	−56.8	----	8	12,038	−59.2	----	----	----	----	----	29	11,770	−58.7	----	17	11,956	−55.8	----	26	11,798	−59.0	----
175	22	13,121	−60.0	----	23	12,582	−56.7	----									24	12,592	−58.3	----	12	12,787	−57.0	----	21	12,618	−58.9	----
150	17	14,074	−64.2	----	15	13,559	−56.5	----									18	13,571	−57.8	----	7	13,748	−58.0	----	17	13,577	−59.7	----
125																	16	14,710	−59.4	----					8	14,768	−60.9	----
100																	5	16,147	−60.3	----								

See footnotes at end of table.

TABLE 1.—*Mean dynamic height (geopotential) in units of 0.98 dynamic meters, temperature in degrees centigrade, and relative humidity in percent, for standard pressures, as obtained by radiosondes during December 1946*—Continued

Standard pressure surface (mb.)	Oklahoma City, Okla. (972.7 mb.)				Omaha, Nebr. (961.4 mb.)				Phoenix, Ariz. (975.8 mb.)				Pittsburgh, Pa. (973.1 mb.)				Portland, Maine (1,014.2 mb.)				Rapid City, S. Dak. (901.3 mb.)				St. Paul, Minn. (969.9 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	391	6.6	76	31	308	−0.2	73	31	339	11.1	60	31	382	1.8	68	31	20	−3.4	76	31	980	−3.3	71	31	225	−5.7	80
1,000	31	161	(*)	----	31	156	(*)	----	31	131	(*)	----	31	160	(*)	----	31	130	−3.8	73	31	143	(*)	----	31	143	(*)	----
950	31	586	7.5	69	31	572	.1	68	31	573	16.3	38	31	580	1.4	68	31	541	−3.7	71	31	558	(*)	----	31	546	−6.7	80
900	31	1,030	6.9	61	31	1,001	.1	62	31	1,024	14.1	33	31	1,009	−.4	69	31	962	−5.0	69	31	992	(*)	----	31	968	−6.3	74
850	31	1,500	7.0	51	31	1,458	.0	54	31	1,504	11.3	34	31	1,464	−2.1	63	31	1,410	−6.5	64	31	1,447	−.7	57	31	1,414	−6.8	71
800	31	1,998	5.4	46	31	1,943	−1.0	48	31	2,006	8.1	34	31	1,945	−3.5	60	31	1,882	−7.6	63	31	1,930	−2.1	54	31	1,887	−7.1	63
750	31	2,528	3.2	44	31	2,463	−3.1	41	31	2,545	5.2	35	31	2,461	−5.0	57	31	2,389	−9.2	60	31	2,444	−4.2	54	31	2,393	−8.4	59
700	31	3,080	.5	43	31	3,000	−6.0	42	31	3,096	1.8	31	31	2,994	−7.1	55	31	2,914	−11.4	58	31	2,982	−7.2	54	31	2,922	−11.2	60
650	31	3,676	−2.6	39	31	3,580	−8.9	39	31	3,695	−1.8	30	31	3,576	−10.1	53	31	3,486	−14.0	56	31	3,559	−10.8	57	31	3,494	−14.4	63
600	31	4,302	−6.4	37	31	4,192	−12.6	43	31	4,321	−6.0	----	31	4,182	−13.2	51	30	4,082	−17.3	56	31	4,167	−14.6	58	31	4,090	−17.8	60
550	31	4,980	−10.7	40	31	4,853	−16.9	50	31	4,998	−10.8	----	31	4,843	−17.1	54	30	4,731	−21.0	----	30	4,822	−18.7	52	31	4,740	−21.8	----
500	31	5,704	−15.5	42	30	5,563	−21.0	----	31	5,722	−16.1	----	31	5,549	−21.4	----	30	5,428	−24.5	----	30	5,534	−23.4	----	31	5,433	−26.2	----
450	31	6,498	−20.6	45	30	6,339	−26.2	----	31	6,520	−21.9	----	29	6,331	−26.2	----	30	6,195	−29.7	----	29	6,291	−28.7	----	31	6,194	−30.7	----
400	31	7,352	−26.8	----	30	7,176	−32.2	----	31	7,365	−28.0	----	29	7,167	−31.9	----	30	7,017	−35.0	----	28	7,124	−33.8	----	31	7,016	−35.8	----
350	31	8,302	−33.9	----	29	8,110	−38.6	----	31	8,310	−35.0	----	29	8,098	−38.0	----	29	7,936	−40.5	----	26	8,032	−40.5	----	31	7,931	−42.2	----
300	31	9,363	−41.9	----	29	9,153	−45.8	----	30	9,371	−43.0	----	28	9,138	−44.9	----	28	8,969	−46.5	----	22	9,091	−46.9	----	30	8,968	−48.7	----
250	30	10,571	−50.6	----	28	10,352	−52.4	----	27	10,581	−51.4	----	26	10,346	−51.8	----	28	10,164	−51.9	----	15	10,312	−53.6	----	29	10,142	−54.4	----
200	25	12,007	−58.1	----	27	11,771	−57.2	----	20	11,975	−58.5	----	23	11,787	−57.6	----	25	11,615	−56.3	----	11	11,740	−59.6	----	23	11,550	−54.8	----
175	18	12,835	−59.8	----	21	12,597	−55.8	----	15	12,777	−58.6	----	21	12,633	−59.1	----	20	12,435	−56.0	----	7	12,629	−59.0	----	21	12,392	−54.6	----
150	12	13,817	−61.1	----	13	13,564	−56.7	----	5	13,797	−61.3	----	16	13,587	−58.5	----	15	13,408	−55.1	----	----	----	----	----	14	13,358	−54.6	----
125	----	----	----	----	5	14,647	−56.6	----	----	----	----	----	7	14,754	−60.4	----	9	14,556	−55.9	----	----	----	----	----	6	14,506	−54.5	----
100	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	5	15,954	−56.3	----	----	----	----	----	----	----	----	----

Standard pressure surface (mb.)	San Antonio, Tex. (990.5 mb.)				San Juan, P. R. (1,013.8 mb.)				Santa Maria, Calif. (1,006.9 mb.)				Sault Ste. Marie, Mich. (987.1 mb.)				Spokane, Wash. (946.6 mb.)				Swan Island, W. I. (1,012.7 mb.)				Tacubaya, Mexico (774.3 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	240	11.5	79	31	15	24.4	81	31	71	10.0	86	31	221	−5.9	85	31	598	0.3	85	31	10	25.7	81	30	2,306	13.5	55
1,000	31	159	(*)	----	31	135	23.5	83	31	145	10.3	83	31	119	(*)	----	31	153	(*)	----	31	121	24.3	82	30	87	(*)	----
950	31	502	13.7	65	31	584	20.4	86	31	579	10.4	67	31	524	−7.1	86	31	571	(*)	----	31	574	21.1	83	30	545	(*)	----
900	31	1,046	12.4	65	31	1,048	17.3	84	31	1,022	10.1	46	31	940	−8.7	86	31	1,002	−.1	79	31	1,037	18.0	81	30	1,016	(*)	----
850	31	1,525	11.0	54	31	1,535	14.3	53	31	1,497	8.7	38	31	1,382	−9.7	80	31	1,458	−1.4	72	31	1,525	15.1	78	30	1,508	(*)	----
800	31	2,030	9.7	44	31	2,046	12.0	72	31	1,995	6.4	36	31	1,848	−11.2	70	31	1,940	−3.4	60	31	2,036	12.6	71	30	2,030	(*)	----
750	31	2,565	7.7	38	31	2,591	10.3	52	31	2,528	3.6	34	31	2,349	−12.8	64	31	2,454	−5.7	67	31	2,582	9.9	60	30	2,575	11.9	56
700	31	3,129	4.9	33	31	3,157	7.8	48	31	3,077	.0	35	31	2,866	−14.5	58	31	2,986	−8.7	68	31	3,147	7.1	50	30	3,149	8.0	62
650	30	3,727	1.1	34	31	3,770	4.9	----	31	3,669	−3.8	35	31	3,432	−17.1	59	31	3,564	−12.0	66	31	3,755	3.8	45	30	3,758	3.5	70
600	30	4,368	−2.9	----	31	4,413	1.3	----	31	4,293	−7.9	37	30	4,021	−19.7	60	31	4,165	−15.4	62	30	4,400	.5	----	30	4,401	−1.1	76
550	30	5,051	−7.1	----	30	5,109	−2.4	----	31	4,965	−12.5	44	30	4,668	−23.3	----	31	4,820	−19.6	60	30	5,090	−3.7	----	30	5,094	−4.9	62
500	30	5,788	−11.9	----	29	5,858	−7.0	----	31	5,685	−17.3	44	30	5,353	−27.4	----	31	5,518	−24.3	----	29	5,839	−8.3	----	30	5,836	−9.1	43
450	29	6,600	−17.0	----	29	6,680	−12.8	----	31	6,472	−22.7	----	30	6,113	−32.5	----	31	6,285	−29.4	----	28	6,661	−13.1	----	30	6,654	−13.5	----
400	29	7,467	−23.5	----	29	7,559	−19.1	----	31	7,321	−28.7	----	30	6,925	−37.9	----	31	7,110	−35.1	----	28	7,539	−18.8	----	30	7,530	−19.9	----
350	28	8,426	−31.0	----	29	8,538	−26.3	----	30	8,261	−35.6	----	29	7,838	−43.8	----	30	8,023	−41.9	----	28	8,520	−26.1	----	30	8,507	−27.2	----
300	27	9,500	−38.8	----	29	9,633	−34.6	----	30	9,317	−42.9	----	28	8,849	−49.9	----	30	9,050	−49.2	----	27	9,618	−34.6	----	30	9,599	−35.8	----
250	24	10,732	−47.6	----	29	10,882	−43.8	----	28	10,520	−50.7	----	27	10,032	−54.1	----	29	10,222	−56.4	----	27	10,865	−44.6	----	30	10,840	−45.6	----
200	21	12,177	−55.0	----	27	12,347	−54.1	----	24	11,941	−57.0	----	20	11,471	−54.0	----	19	11,595	−59.8	----	26	12,318	−56.1	----	28	12,295	−56.4	----
175	18	13,010	−59.7	----	26	13,191	−59.6	----	22	12,792	−58.1	----	17	12,334	−52.4	----	13	12,392	−57.0	----	23	13,151	−61.6	----	22	13,139	−61.5	----
150	13	13,974	−62.7	----	17	14,140	−65.1	----	13	13,721	−57.8	----	11	13,336	−53.1	----	7	13,351	−55.1	----	14	14,094	−65.9	----	15	14,080	−66.4	----
125	7	15,084	−65.5	----	6	15,276	−68.8	----	10	14,859	−58.8	----	7	14,517	−54.1	----	6	14,510	−55.1	----	----	----	----	----	5	15,178	−70.9	----

Standard pressure surface (mb.)	Tampa, Fla. (1,019.6 mb.)				Tatoosh Island, Wash. (1,012.4 mb.)				Toledo, Ohio (994.9 mb.)				Washington, D. C. (1,017.3 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	28	9	16.6	83	31	31	5.5	85	31	191	0.0	77	31	23	4.9	63
1,000	28	174	17.4	78	31	131	4.7	82	31	150	(*)	----	31	164	4.3	58
950	28	614	16.2	73	31	554	3.2	80	31	558	−.6	73	31	586	3.7	58
900	28	1,071	13.8	69	31	985	1.4	75	31	991	−2.4	69	31	1,020	2.2	60
850	28	1,551	11.2	62	31	1,444	−.8	74	31	1,444	−3.1	62	31	1,481	.5	57
800	28	2,056	9.8	40	31	1,926	−2.8	63	31	1,923	−4.2	54	31	1,966	−1.0	56
750	28	2,595	8.2	----	31	2,444	−5.2	57	31	2,434	−5.5	52	31	2,485	−2.5	51
700	28	3,156	5.2	----	31	2,975	−8.0	54	31	2,970	−7.6	54	31	3,025	−4.9	45
650	28	3,759	1.9	----	31	3,552	−11.1	55	31	3,549	−10.2	50	31	3,609	−7.7	46
600	28	4,398	−1.7	----	30	4,159	−14.5	58	31	4,158	−13.5	50	30	4,225	−11.5	44
550	28	5,083	−6.0	----	29	4,817	−18.7	60	31	4,814	−17.6	56	30	4,880	−15.6	46
500	28	5,825	−10.9	----	29	5,521	−22.9	----	31	5,521	−22.3	----	29	5,598	−20.5	53
450	27	6,630	−16.4	----	28	6,290	−27.7	----	31	6,291	−27.9	----	29	6,374	−26.0	----
400	26	7,502	−22.7	----	27	7,130	−33.5	----	31	7,123	−33.6	----	28	7,220	−31.6	----
350	26	8,467	−30.0	----	26	8,048	−40.1	----	29	8,035	−39.9	----	28	8,151	−38.3	----
300	26	9,545	−38.5	----	23	9,099	−46.7	----	27	9,054	−46.5	----	27	9,199	−45.6	----
250	23	10,774	−48.1	----	18	10,303	−53.8	----	23	10,216	−52.0	----	25	10,387	−53.9	----
200	18	12,217	−57.6	----	7	11,613	−55.7	----	19	11,652	−55.7	----	19	11,819	−58.9	----
175	16	13,047	−61.4	----	----	----	----	----	16	12,504	−56.2	----	11	12,646	−57.1	----
150	13	14,001	−64.5	----	----	----	----	----	11	13,473	−57.0	----	8	13,618	−58.5	----
125	10	15,114	−68.4	----	----	----	----	----	----	----	----	----	----	----	----	----

[1] Insufficient observations.

[2] Station elevation changed from 2 to 6 meters on December 6, 1946. Surface data for new location only.

NOTE.—Late report for Havana, Cuba, November 1946, omitted due to insufficient observations.

*Temperature and relative humidity data for this level are not available or are available only for certain days. See note entitled "Change in Summarization of Radiosonde Data," p. 6, in the January 1946 issue of the MONTHLY WEATHER REVIEW.

NOTE.—All observations scheduled between 0300 and 0500, G. C. T., except at Ciudad Victoria, Mazatlan, and Merida, where they are taken near 0200, G. C. T. "Number of observations" refers to those of dynamic height only. (In a few cases temperature or humidity data may be missing from one or more standard pressure surfaces of some observations.) Relative humidity data are not published for standard pressure surfaces having a corresponding mean temperature below −30° C.

All relative humidity observations are obtained by electric hygrometer and have been adjusted to compensate for the values occurring below the operating range of the humidity element. For explanation of the adjustment see article entitled "Curve Method for Obtaining Monthly Means of Relative Humidity," p. 241, MONTHLY WEATHER REVIEW, December 1944.

None of the means included in these tables are based on less than 15 observations at the surface or 5 observations at a standard pressure level.

TABLE 2.—*Free-air resultant winds based on pilot balloon observations made near 5 p. m., E. S. T. (2200 G. C. T.) during December 1946. Directions given in degrees from north (N=360°, E=90°, S=180°, W=270°). Velocities in meters per second*

Altitude (meters) m. s. l.	Abilene, Tex. (534 m.)			Albuquerque, N. Mex. (1,630 m.)			Atlanta, Ga. (299 m.)			Billings, Mont. (1,095 m.)			Bismarck, N. Dak. (512 m.)			Boise, Idaho (868 m.)			Brownsville, Tex. (7 m.)			Buffalo, N. Y. (220 m.)			Burlington, Vt. (100 m.)			Charleston, S. C. (16 m.)			Cincinnati, Ohio (150 m.)			Denver, Colo. (1,627 m.)			El Paso, Tex. (1,198 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	31	245	1.5	31	256	0.8	29	285	1.3	29	254	3.7	29	286	2.4	31	333	0.9	28	140	2.4	25	251	5.5	28	229	2.0	29	285	0.8	29	251	2.1	30	318	2.3	31	280	0.9
500							29	267	2.0										28	154	3.9	25	253	7.7	28	238	6.4	29	273	1.9	29	239	4.3						
1,000	31	227	3.0				28	265	2.8				28	293	6.6	31	329	0.8	22	148	5.0	21	255	10.3	25	252	8.6	25	268	5.5	27	246	7.1						
1,500	29	231	4.4				26	269	5.1	29	263	9.3	25	296	9.6	31	269	2.3	22	172	3.7	11	272	12.9	19	263	9.4	25	269	7.7	25	262	10.7				31	281	1.2
2,000	28	247	7.0	31	227	1.6	26	276	7.6	28	275	12.5	23	297	11.9	30	269	4.7	21	200	2.3	10	282	14.9	12	272	14.0	25	268	8.8	20	275	13.4	30	297	2.8	31	247	2.0
2,500	26	259	9.5	31	263	3.1	23	276	9.0	28	280	13.6	22	300	13.6	29	272	6.6	20	204	2.4							25	268	11.1	14	271	14.0	30	276	4.5	29	254	5.6
3,000	25	261	9.9	31	272	5.9	22	277	11.3	27	287	13.3	19	305	15.4	26	270	6.4	19	211	3.5							24	274	11.5	12	275	13.9	29	277	6.7	29	265	7.0
4,000	23	263	11.0	30	279	9.3	22	277	14.7	23	294	15.8	13	298	17.3	18	268	6.2	15	218	4.8							21	281	13.8				28	290	11.5	27	266	8.5
5,000	22	270	12.1	29	268	13.5	19	277	17.6	17	297	19.3	13	297	20.0	15	295	9.1	14	214	6.7							19	279	16.4				27	295	16.6	26	263	10.6
6,000	19	259	10.9	27	255	14.0	18	281	20.6	16	293	20.8	13	295	21.5	13	300	11.0	10	226	6.8							19	275	18.8				24	278	17.6	25	265	11.3
8,000	10	291	12.0	24	263	17.6																												21	272	23.9	20	271	14.5
10,000				13	288	18.9																															14	278	19.3

Altitude (meters) m. s. l.	Ely, Nev. (1,910 m.)			Grand Junction, Colo. (1,475 m.)			Greensboro, N. C. (271 m.)			Havre, Mont. (767 m.)			Jacksonville, Fla. (16 m.)			Joliet, Ill. (178 m.)			Las Vegas, Nev. (575 m.)			Little Rock, Ark. (88 m.)			Medford, Oreg. (416 m.)			Miami, Fla. (12 m.)			Mobile, Ala. (66 m.)			Nashville, Tenn. (194 m.)			New York, N. Y. (15 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	30	202	0.8	31	298	1.8	29	237	1.4	28	241	3.1	28	25	1.2	28	243	2.8	31	47	0.8	29	211	1.0	27	335	0.1	31	87	3.0	29	21	0.6	29	227	1.9	28	279	5.0
500							29	254	2.9				28	268	0.9	28	242	4.3				29	225	3.0	27	286	0.2	31	74	6.4	29	140	0.1	29	216	3.5	28	279	8.1
1,000							29	257	5.1	28	244	7.6	27	240	2.3	24	253	6.8	31	50	1.4	27	241	4.8	27	173	1.6	30	79	5.5	28	228	1.0	27	234	5.6	28	278	9.9
1,500				31	297	1.8	29	270	8.1	28	278	10.7	27	245	3.5	24	278	9.9	31	25	1.2	26	260	6.8	27	208	3.7	28	85	4.4	26	259	2.7	24	248	7.4	26	270	12.5
2,000	30	197	0.9	31	300	1.0	27	274	10.9	26	283	11.4	25	250	3.7	21	282	14.0	31	269	1.2	25	267	9.1	24	230	4.5	26	83	2.7	25	262	4.8	23	263	10.6	19	279	14.3
2,500	30	240	1.4	31	223	2.7	27	276	13.3	23	283	12.8	24	264	5.1	17	283	15.5	31	271	3.1	22	271	11.9	17	233	3.0	23	98	2.2	24	265	6.1	20	270	12.4	14	273	15.8
3,000	28	276	3.5	30	241	5.2	25	278	15.3	22	286	13.6	24	267	5.7	15	285	14.8	30	275	4.2	20	279	14.3	16	242	3.0	23	111	1.6	22	275	8.2	19	276	13.2			
4,000	23	300	9.4	25	285	9.1	23	271	21.2	16	298	14.2	23	270	8.5				26	283	6.1	18	280	16.4	14	251	7.2	17	280	1.5	18	279	8.6	18	277	17.1			
5,000	21	295	12.7	19	292	12.8	19	271	22.3	10	286	15.1	23	275	10.1				24	281	9.4	15	293	19.1	10	291	10.2	14	310	3.6	17	279	10.7	16	282	18.9			
6,000	19	298	15.6	17	290	16.6	16	274	23.9				20	274	13.4				21	290	12.6	12	281	21.1				13	269	5.5	15	289	11.6	13	286	18.9			
8,000	14	308	16.6										13	289	16.9				14	291	19.0																		
10,000													12	285	20.4																								

Altitude (meters) m. s. l.	Oakland, Calif. (8 m.)			Oklahoma City, Okla. (396 m.)			Omaha, Nebr. (306 m.)			Phoenix, Ariz. (338 m.)			Rapid City, S. Dak. (982 m.)			St. Louis, Mo. (181 m.)			St. Paul, Minn. (225 m.)			San Antonio, Tex. (240 m.)			San Diego, Calif. (13 m.)			Sault Ste. Marie, Mich. (225 m.)			Seattle, Wash. (116 m.)			Spokane, Wash. (603 m.)			Washington, D. C. (24 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	29	317	1.1	28	206	1.7	28	276	2.0	31	87	0.4	29	299	1.4	29	177	1.7	28	263	2.2	30	169	1.1	29	291	2.3	18	302	2.0	23	202	2.0	27	215	1.7	27	286	2.0
500	29	34	1.6	28	213	1.9	28	274	2.5	31	99	0.7				29	218	3.0	28	254	3.9	30	169	1.6	29	260	1.0	18	272	3.2	23	199	3.9				27	265	5.4
1,000	26	17	2.1	28	226	3.9	27	254	4.8	30	109	1.3	29	299	1.5	25	246	5.2	26	254	7.0	30	188	2.4	27	147	1.6	13	285	8.1	19	220	4.1	27	223	3.7	26	268	8.7
1,5000	24	352	1.4	26	249	4.8	26	274	7.7	30	136	1.7	29	296	6.0	22	209	7.5	22	274	10.1	25	234	3.4	26	131	0.7				17	239	3.9	23	240	8.0	25	278	12.5
2,000	21	357	1.7	24	253	8.0	26	279	10.9	29	159	1.3	29	291	9.0	21	270	10.8	21	281	11.5	25	237	6.3	25	8	0.4				13	271	3.5	21	249	8.8	25	277	14.7
2,500	19	346	2.9	24	260	10.3	24	281	12.7	29	203	1.2	26	296	11.2	20	270	13.8	20	287	13.2	22	238	7.2	21	330	1.0				13	294	5.8	17	263	9.3	25	278	17.2
3,000	19	331	4.1	22	269	11.8	24	282	14.0	29	269	1.7	26	297	13.1	20	270	16.1	17	289	15.6	21	238	8.1	21	320	1.8				11	308	4.9	12	292	9.6	23	278	18.1
4,000	16	309	5.4	20	272	15.7	19	274	18.5	28	278	4.4	24	291	15.3	16	273	18.9	15	289	18.6	20	246	8.6	17	321	3.5										18	274	19.2
5,000	13	321	8.2	20	276	17.0	17	275	21.6	27	267	6.3	21	284	17.4	14	279	17.5	11	291	21.3	19	262	9.0	13	327	8.7										13	282	20.2
6,000	11	333	11.9	17	275	20.5	14	280	25.1	24	268	8.4	16	282	20.6	12	279	21.1				17	269	9.6																
8,000										14	309	13.2										16	275	10.5															
10,000																						12	281	13.5															

TABLE 3.—*Maximum free-air wind velocities (m. p. s.) for different sections of the United States based on pilot balloon observations during December 1946*

Section	Surface to 2,500 meters (m. s. l.)					2,501 to 5,000 meters (m. s. l.)					Above 5,000 meters (m. s. l.)				
	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station
Northeast [1]	51.5	w.	2,500	26	Nantucket, Mass.	64.8	wsw.	4,912	31	Caribou, Maine	81.2	sw.	7,892	2	Caribou, Maine.
East-Central [2]	47.2	wsw.	1,946	13	Richmond, Va.	54.2	wnw.	2,852	13	Elkins, W. Va.	80.6	wsw.	10,820	14	Hatteras, N. C.
Southeast [3]	50.0	n.	2,476	21	Charleston, S. C.	49.8	n.	2,501	21	Charleston, S. C.	63.0	w.	11,847	22	Spartanburg, S. C.
North-Central [4]	41.3	sw.	1,182	12	Alpena, Mich.	50.0	nw.	3,732	26	Marquette, Mich.	81.2	wsw.	9,748	9	Green Bay, Wis.
Central [5]	48.2	sw.	1,537	27	Moline, Ill.	64.0	wsw.	3,552	8	Indianapolis, Ind.	88.0	sw.	10,963	31	Goodland, Kans.
South-Central [6]	34.0	nw.	2,500	21	Memphis, Tenn.	50.8	ssw.	4,423	12	Fort Worth, Tex.	89.8	nnw.	16,551	5	New Orleans, La.
	34.0	ssw.	1,196	8	Tulsa, Okla.										
Northwest [7]	42.8	w.	2,477	11	Havre, Mont.	60.0	wsw.	5,000	15	Tatoosh Island, Wash.	71.3	nnw.	13,606	22	Ellensburg, Wash.
West-Central [8]	56.4	wnw.	2,489	23	Cheyenne, Wyo.	59.8	nnw.	4,136	28	Reno, Nev.	82.0	s.	11,600	24	Oakland, Calif.
Southwest [9]	45.2	wnw.	2,500	29	El Paso, Tex.	54.0	wnw.	4,778	28	El Paso, Tex.	62.4	w.	12,965	29	Tucson, Ariz.

[1] Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and northern Ohio.
[2] Delaware, Maryland, Virginia, West Virginia, southern Ohio, Kentucky, eastern Tennessee, and North Carolina.
[3] South Carolina, Georgia, Florida, and Alabama.
[4] Michigan, Wisconsin, Minnesota, North Dakota, and South Dakota.
[5] Indiana, Illinois, Iowa, Nebraska, Kansas, and Missouri.
[6] Mississippi, Arkansas, Louisiana, Oklahoma, Texas (except El Paso), and western Tennessee.
[7] Montana, Idaho, Washington, and Oregon.
[8] Wyoming, Colorado, Utah, northern Nevada, and northern California.
[9] Southern California, southern Nevada, Arizona, New Mexico, and extreme west Texas.

AEROLOGICAL OBSERVATIONS FOR THE YEAR 1946

TABLE 1A.— *Mean dynamic height (geopotential) in units of 0.98 dynamic meters, temperature in degrees centigrade, and relative humidity in percent, for standard pressures, as obtained by radiosondes during year 1946*

STATIONS AND MEAN SURFACE PRESSURES

Standard pressure surface (mb.)	Albany, N. Y. (1,006.0 mb.)				Albuquerque, N. Mex. (837.4 mb.)				Apalachicola, Fla. (1,017.6 mb.)				Atlanta, Ga. (983.9 mb.)				Big Spring, Tex. (926.7 mb.)				Bismarck, N. Dak. (954.7 mb.)				Boise, Idaho (915.7 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	360	86	7.6	76	363	1,620	14.7	39	357	5	19.9	84	365	300	15.7	75	362	774	18.1	52	360	505	5.7	70	358	868	11.5	56
1,000	360	141	7.5	73	363	85	(*)	----	357	156	20.1	78	365	161	(*)	----	362	112	(*)	----	360	120	(*)	----	358	121	(*)	----
950	360	566	6.8	71	363	537	(*)	----	357	599	18.1	71	365	602	16.1	66	362	558	(*)	----	360	545	5.1	68	358	561	(*)	----
900	360	1,007	4.7	70	363	1,004	(*)	----	357	1,061	15.6	67	365	1,057	13.8	65	362	1,024	18.8	48	360	988	6.0	62	358	1,012	12.7	49
850	360	1,471	2.5	69	363	1,492	(*)	----	357	1,543	13.2	62	365	1,538	11.4	61	361	1,511	15.5	46	360	1,455	4.4	60	358	1,489	9.8	47
800	360	1,960	.3	66	363	2,005	13.1	37	357	2,051	11.0	54	365	2,042	9.2	57	361	2,023	12.8	45	359	1,947	2.3	58	358	1,989	6.2	50
750	360	2,481	−1.8	61	363	2,545	9.2	40	357	2,590	8.4	----	365	2,580	6.6	50	360	2,564	9.5	45	359	2,472	−.5	57	358	2,519	2.5	52
700	360	3,022	−4.2	56	363	3,112	5.0	44	357	3,154	5.4	----	364	3,138	3.6	48	360	3,131	5.9	45	359	3,015	−3.6	55	358	3,069	−1.2	53
650	357	3,608	−7.0	54	362	3,712	.5	47	355	3,757	2.1	----	360	3,739	.3	----	360	3,735	2.1	----	357	3,601	−7.0	55	358	3,660	−5.2	55
600	349	4,224	−10.3	----	362	4,349	−4.2	52	354	4,389	−1.6	----	358	4,373	−3.4	----	358	4,375	−2.2	----	354	4,218	−10.6	55	357	4,280	−9.3	55
550	345	4,890	−14.1	----	362	5,028	−8.9	55	352	5,085	−5.7	----	357	5,058	−7.4	----	351	5,059	−6.7	----	352	4,884	−14.8	54	355	4,950	−13.7	54
500	341	5,607	−18.6	----	361	5,762	−14.0	58	350	5,826	−10.3	----	355	5,793	−12.0	----	347	5,799	−11.5	----	352	5,597	−19.6	54	352	5,666	−18.6	52
450	339	6,390	−23.7	----	360	6,559	−19.3	----	345	6,634	−15.5	----	355	6,599	−17.3	----	330	6,605	−16.9	----	351	6,381	−24.9	49	348	6,449	−24.0	----
400	337	7,236	−29.4	----	356	7,421	−25.3	----	340	7,506	−21.7	----	354	7,463	−23.5	----	336	7,474	−23.1	----	344	7,221	−30.6	----	345	7,294	−30.2	----
350	335	8,174	−36.3	----	356	8,377	−32.3	----	338	8,477	−28.8	----	351	8,428	−30.7	----	324	8,439	−30.1	----	335	8,159	−37.6	----	337	8,229	−37.3	----
300	333	9,227	−43.6	----	356	9,446	−40.2	----	337	9,560	−37.1	----	349	9,500	−38.7	----	312	9,517	−37.9	----	331	9,207	−44.8	----	332	9,276	−45.0	----
250	327	10,434	−50.9	----	348	10,667	−48.7	----	332	10,794	−46.8	----	347	10,726	−47.9	----	282	10,752	−46.5	----	288	10,414	−51.5	----	294	10,474	−52.5	----
200	292	11,871	−56.3	----	313	12,108	−55.8	----	326	12,239	−56.9	----	334	12,168	−56.8	----	248	12,206	−54.5	----	220	11,844	−54.7	----	276	11,895	−56.7	----
175	264	12,715	−57.2	----	256	12,952	−58.1	----	308	13,075	−61.5	----	311	13,008	−60.2	----	188	13,067	−57.9	----	185	12,718	−55.0	----	229	12,732	−56.1	----
150	226	13,681	−57.6	----	176	13,923	−61.0	----	270	14,020	−65.3	----	270	13,960	−62.9	----	128	14,036	−61.4	----	148	13,701	−55.0	----	175	13,703	−56.4	----
125	172	14,849	−58.6	----					174	15,122	−68.5	----	173	15,071	−65.2	----									94	14,894	−57.6	----

Standard pressure surface (mb.)	Brownsville, Tex. (1,014.0 mb.)				Buffalo, N. Y. (990.2 mb.)				Burrwood, La. (1,017.5 mb.)				Caribou, Maine (991.8 mb.)				Charleston, S. C. (1,017.3 mb.)				Ciudad Victoria, Mexico (974.3 mb.)				Columbia, Mo.[1] (988.9 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	364	6	22.3	84	362	221	8.3	75	337	2	20.7	86	364	191	2.5	82	363	14	16.7	86	357	335	24.4	62	362	239	13.4	70
1,000	364	126	22.0	82	362	142	(*)	----	337	152	20.4	82	364	123	(*)	----	363	160	17.9	79	357	104	(*)	----	362	136	(*)	----
950	364	577	19.9	78	362	571	8.0	68	337	598	17.9	76	364	542	2.7	73	363	602	16.5	70	357	556	23.3	62	362	574	13.1	62
900	364	1,038	18.2	66	362	1,012	5.8	69	337	1,050	15.8	66	364	976	.7	73	363	1,059	14.2	66	356	1,025	20.1	64	362	1,022	11.1	61
850	364	1,526	16.5	55	362	1,478	3.2	68	337	1,540	13.8	57	364	1,433	−1.2	73	363	1,540	12.0	61	353	1,516	16.9	67	362	1,498	9.0	58
800	363	2,041	14.3	48	362	1,968	.9	64	337	2,050	11.7	51	364	1,916	−3.1	68	363	2,046	9.7	55	352	2,032	14.1	66	362	1,999	6.7	55
750	363	2,587	11.7	44	362	2,491	−1.5	58	337	2,592	9.1	46	364	2,429	−5.2	65	363	2,584	7.2	51	351	2,578	11.4	62	362	2,532	4.3	49
700	363	3,158	8.4	41	362	3,032	−3.9	52	336	3,157	6.1	43	362	2,964	−7.6	62	363	3,145	4.1	48	351	3,149	8.5	53	361	3,085	1.3	47
650	357	3,768	4.7	40	361	3,620	−6.8	50	335	3,764	2.6	----	361	3,542	−10.2	58	354	3,745	.8	----	343	3,759	4.8	50	361	3,680	−1.9	45
600	353	4,414	.4	41	359	4,234	−10.3	47	333	4,405	−1.3	----	359	4,141	−13.4	56	352	4,383	−2.9	----	339	4,406	.7	49	358	4,311	−5.6	42
550	352	5,107	−4.1	41	355	4,904	−14.2	----	333	5,097	−5.4	----	358	4,809	−17.1	54	345	5,066	−6.9	----	332	5,098	−3.5	49	356	4,990	−9.8	41
500	349	5,852	−8.7	----	353	5,618	−18.7	----	332	5,835	−10.1	----	354	5,518	−21.5	----	339	5,804	−11.5	----	327	5,847	−8.2	----	355	5,717	−14.5	----
450	345	6,667	−14.0	----	343	6,403	−23.8	----	330	6,647	−15.4	----	350	6,295	−26.6	----	329	6,610	−16.8	----	316	6,663	−13.3	----	352	6,514	−19.8	----
400	339	7,546	−20.0	----	335	7,248	−29.6	----	327	7,521	−21.5	----	348	7,128	−32.2	----	323	7,479	−22.8	----	311	7,546	−19.2	----	350	7,372	−25.9	----
350	333	8,521	−27.1	----	327	8,188	−36.3	----	320	8,490	−28.7	----	345	8,056	−38.8	----	318	8,445	−29.9	----	298	8,525	−26.5	----	347	8,326	−32.8	----
300	329	9,614	−35.4	----	307	9,241	−43.6	----	312	9,574	−36.8	----	335	9,097	−45.4	----	311	9,524	−38.0	----	289	9,618	−34.9	----	339	9,394	−40.6	----
250	317	10,857	−44.8	----	284	10,452	−50.5	----	303	10,809	−46.1	----	322	10,297	−50.9	----	299	10,755	−47.4	----	285	10,865	−44.6	----	318	10,611	−49.2	----
200	308	12,315	−55.0	----	244	11,895	−55.1	----	279	12,263	−55.6	----	288	11,741	−53.8	----	283	12,199	−57.0	----	278	12,321	−55.7	----	263	12,052	−55.7	----
175	284	13,159	−59.9	----	213	12,732	−56.0	----	246	13,104	−60.0	----	254	12,595	−54.1	----	263	13,037	−60.8	----	267	13,160	−61.1	----	223	12,899	−57.4	----
150	230	14,112	−64.2	----	176	13,731	−57.0	----	168	14,054	−63.7	----	212	13,574	−54.4	----	232	13,988	−63.8	----	235	14,116	−65.5	----	155	13,970	−59.0	----
125													151	14,734	−54.8	----	171	15,094	−66.3	----	134	15,220	−69.8	----				

	Dodge City, Kans. (924.1 mb.)				El Paso, Tex. (880.8 mb.)				Ely, Nev. (808.6 mb.)				Fort Worth, Tex. (991.2 mb.)				Glasgow, Mont. (938.2 mb.)				Grand Junction, Colo.[2] (853.7 mb.)				Great Falls, Mont. (885.4 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	360	787	13.1	61	364	1,195	18.9	35	365	1,908	7.4	55	360	211	19.0	64	360	648	6.7	63	360	1,474	12.0	46	364	1,128	8.0	54
1,000	360	112	(*)	----	364	87	(*)	----	365	112	(*)	----	360	133	(*)	----	360	116	(*)	----	360	106	(*)	----	364	109	(*)	----
950	360	553	(*)	----	364	545	(*)	----	365	557	(*)	----	360	580	18.1	59	360	546	(*)	----	360	556	(*)	----	364	545	(*)	----
900	360	1,010	14.1	54	364	1,014	(*)	----	365	1,015	(*)	----	359	1,036	15.9	58	360	990	7.3	58	360	1,017	(*)	----	364	997	(*)	----
850	360	1,491	12.4	49	364	1,502	18.4	32	365	1,491	(*)	----	359	1,520	13.5	56	359	1,458	5.0	56	360	1,495	12.0	46	364	1,466	7.3	49
800	360	1,997	10.1	46	364	2,018	14.6	34	365	1,997	9.2	49	359	2,029	11.2	51	359	1,950	2.2	58	360	2,002	10.4	40	364	1,962	4.0	52
750	359	2,535	7.1	43	364	2,563	10.6	36	365	2,534	6.4	44	359	2,569	8.5	48	359	2,472	−1.1	59	360	2,540	6.7	43	364	2,487	0.4	56
700	359	3,095	3.6	42	364	3,129	6.4	41	365	3,091	2.2	46	358	3,133	5.4	42	359	3,016	−4.5	60	360	3,098	2.4	47	364	3,034	−3.3	60
650	359	3,695	−.3	42	364	3,734	1.9	42	365	3,687	−2.1	50	353	3,737	1.8	----	359	3,599	−8.1	59	360	3,693	−2.0	51	363	3,620	−7.3	62
600	359	4,328	−4.6	42	364	4,373	−2.8	46	365	4,317	−6.5	54	351	4,376	−2.1	----	357	4,213	−11.8	58	360	4,323	−6.6	55	361	4,236	−11.3	60
550	355	5,008	−9.3	----	363	5,057	−7.6	47	364	4,991	−11.3	54	347	5,064	−6.5	----	356	4,874	−16.0	57	357	4,996	−11.5	56	361	4,899	−15.7	57
500	353	5,738	−14.2	----	361	5,792	−12.5	----	363	5,715	−16.4	50	342	5,801	−11.3	----	352	5,586	−20.6	55	355	5,720	−16.5	54	360	5,610	−20.6	55
450	353	6,536	−19.6	----	356	6,596	−17.8	----	361	6,507	−21.7	----	331	6,607	−16.6	----	349	6,362	−26.0	56	350	6,510	−22.0	----	357	6,388	−26.0	57
400	353	7,394	−25.7	----	354	7,460	−23.9	----	359	7,358	−27.8	----	324	7,478	−22.8	----	342	7,202	−31.9	----	348	7,360	−28.1	----	355	7,224	−32.1	----
350	349	8,347	−32.8	----	353	8,420	−31.0	----	358	8,302	−34.8	----	309	8,443	−29.9	----	331	8,131	−39.0	----	342	8,306	−35.1	----	353	8,154	−39.0	----
300	344	9,414	−40.6	----	348	9,495	−39.0	----	354	9,360	−42.6	----	302	9,523	−37.9	----	307	9,169	−46.2	----	338	9,361	−43.0	----	346	9,194	−46.6	----
250	339	10,633	−49.2	----	344	10,721	−47.9	----	348	10,570	−50.7	----	276	10,757	−46.7	----	277	10,363	−52.8	----	321	10,569	−50.7	----	324	10,390	−53.4	----
200	303	12,074	−56.3	----	326	12,166	−56.1	----	304	11,995	−56.6	----	241	12,210	−55.2	----	211	11,786	−54.5	----	273	11,995	−56.2	----	256	11,808	−55.7	----
175	270	12,915	−58.5	----	289	13,004	−59.5	----	258	12,836	−57.4	----	205	13,054	−58.9	----	159	12,674	−53.4	----	228	12,841	−57.3	----	205	12,673	−54.8	----
150	212	13,880	−60.1	----	228	13,976	−62.9	----	210	13,800	−58.7	----	136	14,023	−61.8	----	121	13,662	−53.9	----	171	13,826	−59.2	----	174	13,666	−54.3	----
125	104	15,027	−62.9	----	118	15,083	−66.2	----	123	14,957	−60.8	----																

See footnotes at end of table.

TABLE 1A.—*Mean dynamic height (geopotential) in units of 0.98 dynamic meters, temperature in degrees centigrade, and relative humidity in percent, for standard pressures, as obtained by radiosondes during year 1946*— Continued

Standard pressure surface (mb)	Greensboro, N. C. (987.1 mb.)				Hatteras, N. C. (1,018.6 mb.)				Havana, Cuba [3] (.... mb.)				Huntington, W. Va. (907.9 mb.)				International Falls,[4] Minn. (973.7 mb.)				Joliet, Ill. (995.6 mb.)				Lake Charles, La. (1,016.5 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	362	273	13.1	77	362	3	16.7	84	....	....	....	....	360	172	10.8	82	360	360	2.7	77	364	178	9.2	78	359	5	19.0	86
1,000	362	163	(*)	....	362	160	16.6	78	....	....	....	....	360	153	(*)	....	360	133	(*)	....	364	140	(*)	....	359	145	19.6	79
950	362	598	13.8	66	362	598	14.8	70	....	....	....	....	360	588	12.4	65	360	551	3.0	72	364	569	9.7	67	359	592	17.5	72
900	362	1,051	11.4	66	361	1,052	12.6	65	....	....	....	....	359	1,036	9.8	66	360	987	1.2	72	364	1,015	8.0	63	359	1,048	15.5	66
850	362	1,527	8.9	65	361	1,531	10.4	61	....	....	....	....	359	1,509	7.2	66	360	1,446	−.2	69	364	1,481	6.0	61	359	1,532	13.6	59
800	362	2,027	6.5	61	361	2,034	8.2	55	....	....	....	....	359	2,006	4.8	61	360	1,930	−1.9	66	364	1,981	3.8	56	359	2,042	11.6	53
750	360	2,560	4.1	56	359	2,574	6.0	50	....	....	....	....	358	2,534	2.5	56	360	2,448	−4.1	60	364	2,507	1.4	53	358	2,589	9.2	47
700	359	3,114	1.3	51	358	3,127	3.5	47	....	....	....	....	357	3,085	−.2	52	360	2,983	−6.7	55	363	3,056	−1.3	51	357	3,149	6.2	43
650	357	3,710	−1.9	49	355	3,726	−.2	....	....	....	....	....	351	3,678	−3.3	51	360	3,564	−9.7	53	359	3,646	−4.4	48	353	3,756	2.7	....
600	354	4,339	−5.4	46	354	4,360	−3.8	....	....	....	....	....	346	4,305	−6.7	....	356	4,173	−13.2	54	359	4,270	−8.1	49	352	4,396	−1.3	....
550	352	5,016	−9.6	....	349	5,042	−7.9	....	....	....	....	....	342	4,980	−10.7	....	354	4,831	−17.2	53	356	4,940	−12.1	47	351	5,086	−5.5	....
500	350	5,747	−14.2	....	347	5,777	−12.5	....	....	....	....	....	338	5,707	−15.2	....	349	5,540	−21.6	....	355	5,664	−16.6	....	350	5,825	−10.2	....
450	348	6,544	−19.5	....	343	6,580	−17.7	....	....	....	....	....	337	6,500	−20.5	....	348	6,317	−26.7	....	355	6,452	−21.9	....	349	6,638	−15.7	....
400	346	7,403	−25.7	....	336	7,446	−23.7	....	....	....	....	....	332	7,358	−26.5	....	345	7,149	−32.6	....	348	7,307	−27.8	....	347	7,508	−21.8	....
350	341	8,357	−32.7	....	330	8,408	−30.7	....	....	....	....	....	327	8,310	−33.3	....	337	8,075	−39.4	....	345	8,252	−34.8	....	341	8,478	−28.8	....
300	337	9,425	−40.6	....	321	9,485	−38.7	....	....	....	....	....	313	9,373	−41.1	....	325	9,118	−46.3	....	340	9,313	−42.3	....	338	9,563	−37.0	....
250	331	10,642	−49.5	....	306	10,712	−47.7	....	....	....	....	....	303	10,591	−49.1	....	297	10,316	−52.1	....	330	10,528	−50.2	....	332	10,800	−46.3	....
200	307	12,075	−57.6	....	261	12,156	−56.0	....	....	....	....	....	267	12,033	−56.2	....	256	11,761	−54.1	....	302	11,961	−56.1	....	321	12,250	−56.0	....
175	270	12,915	−60.5	....	218	12,996	−59.5	....	....	....	....	....	232	12,876	−58.3	....	235	12,618	−53.8	....	278	12,806	−57.3	....	302	13,089	−60.4	....
150	208	13,867	−62.2	....	138	13,950	−61.4	....	....	....	....	....	159	13,860	−59.4	....	202	13,642	−54.5	....	246	13,776	−58.5	....	260	14,043	−64.3	....
125	124	15,004	−64.5	....	....	....	....	....	....	....	....	....	92	14,990	−61.0	....	....	....	....	....	181	14,911	−60.0	....	159	15,151	−68.2	....

	Lander, Wyo.[5] (831.2 mb.)				Las Vegas, Nev. (946.5 mb.)				Little Rock, Ark. (1,007.8 mb.)				Mazatlan, Mex.[6] (1,006.2 mb.)				Medford, Oreg. (969.2 mb.)				Merida, Mex. (1,010.8 mb.)				Miami, Fla. (1,017.6 mb.)			
Surface	362	1,606	7.4	55	364	574	20.5	31	361	79	16.2	76	351	14	24.9	76	363	401	14.0	60	359	27	26.3	74	365	4	22.7	84
1,000	362	110	(*)	....	364	92	(*)	....	361	146	16.8	71	351	104	24.4	72	363	136	(*)	....	359	121	25.4	74	365	156	22.8	81
950	362	552	(*)	....	364	542	(*)	....	361	586	15.7	66	351	559	23.4	54	363	575	13.8	57	359	574	22.8	72	365	604	19.9	80
900	362	1,007	(*)	....	364	1,007	19.7	28	361	1,040	13.3	65	351	1,025	21.4	51	363	1,024	10.9	58	359	1,042	20.0	72	365	1,067	17.0	77
850	362	1,482	(*)	....	364	1,495	15.9	29	361	1,520	11.2	60	351	1,518	18.8	49	363	1,498	7.5	62	359	1,533	16.9	72	365	1,553	14.4	70
800	362	1,985	8.3	46	364	2,006	11.9	32	361	2,024	9.0	55	350	2,036	15.8	46	363	1,994	4.1	64	357	2,048	13.8	69	365	2,064	11.9	63
750	362	2,518	4.6	47	364	2,544	7.7	34	361	2,561	6.6	49	350	2,586	12.4	45	362	2,529	1.1	61	355	2,593	11.1	60	364	2,606	9.3	54
700	362	3,073	.6	50	364	3,105	3.6	38	359	3,119	3.7	45	349	3,156	8.7	46	362	3,068	−2.0	54	355	3,164	8.1	53	362	3,171	6.4	52
650	362	3,666	−3.7	54	364	3,703	−.8	42	357	3,721	.4	42	330	3,770	4.6	....	361	3,656	−5.4	50	350	3,774	4.8	49	357	3,778	3.1	....
600	362	4,291	−8.1	56	363	4,337	−5.1	....	354	4,356	−3.4	....	317	4,414	.4	....	361	4,277	−9.1	48	345	4,422	1.1	....	355	4,420	−.6	....
550	362	4,962	−12.8	54	362	5,015	−9.6	....	350	5,040	−7.6	....	312	5,107	−4.2	....	361	4,946	−13.3	48	335	5,116	−3.0	....	351	5,111	−4.7	....
500	362	5,681	−17.8	54	360	5,745	−14.5	....	347	5,774	−12.4	....	305	5,852	−8.9	....	360	5,664	−18.1	50	331	5,865	−7.8	....	349	5,855	−9.4	....
450	360	6,468	−23.5	56	358	6,538	−20.1	....	344	6,578	−17.6	....	296	6,668	−14.3	....	358	6,447	−23.7	....	327	6,684	−13.1	....	345	6,668	−14.6	....
400	359	7,312	−29.8	56	354	7,396	−26.6	....	343	7,442	−23.7	....	296	7,544	−20.2	....	356	7,293	−29.7	....	326	7,566	−19.3	....	340	7,544	−20.7	....
350	352	8,251	−36.8	....	352	8,347	−33.7	....	342	8,403	−30.6	....	274	8,518	−27.6	....	354	8,230	−36.8	....	320	8,543	−26.8	....	336	8,516	−28.2	....
300	350	9,300	−44.7	....	348	9,410	−41.6	....	339	9,480	−38.6	....	260	9,608	−35.9	....	352	9,278	−44.6	....	313	9,636	−35.5	....	331	9,604	−36.7	....
250	342	10,500	−52.3	....	336	10,625	−49.9	....	332	10,708	−47.5	....	240	10,851	−45.3	....	346	10,476	−52.3	....	301	10,879	−45.4	....	326	10,839	−46.5	....
200	299	11,926	−57.3	....	314	12,060	−56.4	....	317	12,154	−56.4	....	196	12,304	−55.9	....	318	11,902	−57.2	....	281	12,332	−56.2	....	307	12,287	−57.0	....
175	256	12,768	−57.4	....	287	12,903	−58.2	....	292	12,996	−59.8	....	143	13,147	−61.1	....	275	12,742	−57.0	....	243	13,169	−61.7	....	290	13,124	−61.8	....
150	210	13,741	−57.9	....	237	13,867	−60.4	....	231	13,958	−62.3	....	....	....	....	....	207	13,718	−57.3	....	155	14,115	−66.9	....	235	14,067	−66.2	....
125	....	....	....	....	145	15,006	−62.7	....	137	15,096	−64.9	....	....	....	....	....	135	14,876	−58.3	....	....	....	....	....	119	15,164	−70.4	....

	Nashville, Tenn. (996.9 mb.)				North Platte, Nebr. (916.8 mb.)				Oakland, Calif.[7] (1,016.5 mb.)				Ogden, Utah (864.3 mb.)				Oklahoma City, Okla. (969.9 mb.)				Omaha, Nebr. (979.1 mb.)				Phoenix, Ariz. (972.3 mb.)			
Surface	362	180	15.4	71	365	849	9.7	70	356	6	13.7	72	365	1,355	10.6	55	364	391	15.8	69	364	308	12.0	71	365	339	23.1	44
1,000	362	152	(*)	....	365	115	(*)	....	356	140	13.1	71	365	116	(*)	....	364	128	(*)	....	364	129	(*)	....	365	91	(*)	....
950	362	590	14.6	65	365	553	(*)	....	356	578	12.4	61	365	559	(*)	....	364	569	16.4	62	364	563	11.5	66	365	544	24.3	32
900	362	1,044	12.2	65	365	1,003	11.6	61	356	1,024	12.4	44	365	1,017	(*)	....	364	1,026	14.5	59	364	1,011	10.1	63	365	1,010	21.0	31
850	362	1,521	9.7	63	365	1,480	10.2	53	356	1,501	10.8	38	365	1,494	11.5	48	364	1,507	12.5	55	364	1,485	8.1	60	365	1,501	17.0	34
800	362	2,023	7.5	58	365	1,982	7.7	51	356	2,004	8.4	....	365	1,998	8.4	45	363	2,014	10.1	50	364	1,984	6.0	55	365	2,014	12.9	36
750	362	2,557	5.1	51	364	2,517	4.6	50	356	2,539	5.7	....	365	2,531	4.4	49	363	2,552	7.4	46	364	2,514	3.4	51	365	2,556	8.8	39
700	361	3,113	2.3	....	364	3,071	1.1	50	356	3,095	2.5	....	365	3,086	.4	52	363	3,114	4.2	42	364	3,068	.3	50	365	3,119	4.7	41
650	357	3,711	−1.0	....	364	3,667	−2.9	49	355	3,693	−1.2	....	365	3,677	−3.7	54	362	3,716	.5	40	363	3,661	−3.2	49	365	3,723	.6	41
600	353	4,344	−4.6	....	364	4,292	−7.0	48	353	4,323	−5.2	....	365	4,303	−8.1	55	359	4,351	−3.6	41	362	4,288	−7.1	46	364	4,356	−3.6	....
550	349	5,025	−8.6	....	361	4,969	−11.5	50	350	5,002	−9.6	....	365	4,973	−12.7	56	357	5,034	−8.0	40	357	4,962	−11.3	44	361	5,040	−8.3	....
500	343	5,757	−13.3	....	358	5,689	−16.4	48	342	5,733	−14.5	....	361	5,694	−17.7	54	350	5,768	−12.8	....	351	5,685	−16.1	....	358	5,771	−13.4	....
450	339	6,557	−18.5	....	358	6,482	−21.8	....	335	6,530	−20.1	....	358	6,480	−23.2	52	347	6,572	−18.2	....	348	6,477	−21.4	....	354	6,574	−18.9	....
400	336	7,421	−24.5	....	357	7,330	−27.9	....	329	7,389	−26.3	....	354	7,327	−29.3	....	345	7,434	−24.3	....	347	7,330	−27.7	....	353	7,433	−25.2	....
350	330	8,380	−31.5	....	355	8,277	−34.7	....	324	8,342	−33.4	....	347	8,269	−36.2	....	338	8,393	−31.2	....	342	8,278	−34.5	....	351	8,388	−32.2	....
300	321	9,452	−39.5	....	352	9,335	−42.5	....	319	9,407	−41.2	....	340	9,320	−44.0	....	336	9,467	−39.2	....	339	9,339	−42.0	....	349	9,458	−40.0	....
250	305	10,674	−48.2	....	341	10,548	−50.4	....	304	10,624	−49.2	....	326	10,524	−51.5	....	327	10,692	−47.8	....	328	10,554	−49.8	....	337	10,680	−48.6	....
200	265	12,119	−55.8	....	312	11,981	−56.0	....	272	12,066	−55.5	....	309	11,950	−56.7	....	301	12,139	−55.6	....	301	11,990	−56.0	....	304	12,119	−56.2	....
175	229	12,972	−58.2	....	283	12,524	−57.3	....	229	12,910	−56.7	....	280	12,792	−57.1	....	267	12,978	−58.6	....	263	12,832	−57.1	....	268	12,957	−58.7	....
150	166	13,929	−60.4	....	222	13,795	−58.4	....	163	13,902	−58.0	....	246	13,765	−58.4	....	225	13,940	−61.4	....	209	13,803	−58.0	....	209	13,923	−61.7	....
125	....	....	....	....	140	14,934	−60.0	....	76	15,044	−59.2	....	158	14,910	−59.5	....	132	15,072	−64.6	....	136	14,940	−59.5	....	119	15,047	−64.3	....

See footnotes at end of table.

TABLE 1A.—*Mean dynamic height (geopotential) in units of 0.98 dynamic meters, temperature in degrees centigrade, and relative humidity in percent, for standard pressures, as obtained by radiosondes during year 1946*—Continued

Standard pressure surface (mb.)	Pittsburgh, Pa. (973.0 mb.)				Portland, Maine (1,014.2 mb.)				Rapid City, S. Dak. (902.2 mb.)				St. Paul, Minn. (988.6 mb.)				San Antonio, Tex. (987.6 mb.)				San Juan, P. R. (1,015.2 mb.)				Santa Maria, Calif. (1,007.6 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	361	382	11.1	67	363	20	5.8	81	364	981	7.6	67	363	225	7.9	72	357	240	19.4	75	353	15	24.9	82	364	71	12.3	80
1,000	361	151	(*)	....	363	135	8.8	76	364	116	(*)	....	363	128	(*)	....	357	131	(*)	....	353	148	23.9	82	364	135	12.1	79
950	361	586	10.8	64	363	560	6.6	68	364	551	(*)	....	363	557	6.9	68	357	576	19.0	69	353	599	20.8	85	364	573	13.4	61
900	361	1,030	8.6	64	363	1,000	4.6	67	364	1,000	(*)	....	363	996	5.4	66	357	1,038	16.7	70	353	1,062	17.8	83	364	1,022	13.9	44
850	361	1,501	6.0	63	362	1,464	2.4	66	364	1,473	7.9	55	363	1,462	3.6	64	357	1,524	14.8	65	353	1,550	15.0	77	364	1,502	12.2	39
800	361	1,996	3.6	60	362	1,953	.4	62	364	1,971	5.1	56	363	1,953	1.6	59	357	2,036	12.7	56	352	2,062	12.6	67	364	2,007	9.3	35
750	361	2,523	1.2	55	362	2,474	−1.8	57	364	2,499	2.1	57	363	2,477	−.7	55	357	2,578	10.2	47	351	2,606	10.3	53	364	2,544	6.4	....
700	361	3,070	−1.3	50	362	3,016	−4.2	53	361	3,049	−1.2	55	363	3,020	−3.4	52	357	3,147	7.2	42	351	3,174	7.6	....	364	3,101	3.2	....
650	356	3,661	−4.4	48	359	3,602	−7.0	51	361	3,640	−5.0	55	358	3,608	−6.6	50	351	3,753	3.5	40	350	3,784	4.4	....	364	3,700	−.4	....
600	355	4,284	−7.9	48	355	4,218	−10.3	50	360	4,260	−9.0	56	357	4,225	−10.1	48	345	4,398	−.6	....	347	4,429	1.0	....	363	4,332	−4.4	....
550	353	4,957	−11.9	....	352	4,884	−14.2	52	353	4,930	−13.4	52	356	4,892	−14.2	48	342	5,087	−4.9	....	344	5,124	−3.0	....	362	5,012	−8.9	....
500	352	5,678	−16.6	....	347	5,600	−18.7	....	349	5,647	−18.2	....	356	5,607	−18.9	49	336	5,830	−9.7	....	339	5,871	−7.6	....	358	5,742	−14.0	....
450	345	6,471	−21.6	....	346	6,383	−24.0	....	346	6,433	−23.6	....	353	6,392	−24.2	....	332	6,643	−15.0	....	334	6,691	−12.9	....	355	6,539	−19.7	....
400	343	7,322	−27.5	....	342	7,226	−29.8	....	341	7,277	−29.7	....	350	7,236	−30.1	....	326	7,517	−21.0	....	334	7,572	−19.0	....	350	7,399	−26.0	....
350	340	8,268	−34.3	....	336	8,166	−36.4	....	336	8,214	−35.6	....	349	8,173	−36.9	....	313	8,489	−28.0	....	329	8,551	−26.2	....	345	8,351	−33.1	....
300	339	9,329	−41.7	....	329	9,217	−43.6	....	324	9,266	−44.2	....	343	9,222	−44.4	....	302	9,577	−36.0	....	324	9,647	−34.4	....	339	9,418	−41.0	....
250	328	10,543	−49.4	....	320	10,424	−50.8	....	300	10,474	−51.5	....	328	10,425	−51.4	....	288	10,818	−45.0	....	321	10,896	−44.0	....	318	10,636	−49.1	....
200	300	11,983	−55.7	....	299	11,858	−55.9	....	253	11,911	−56.3	....	297	11,860	−55.4	....	264	12,278	−54.4	....	301	12,359	−54.7	....	271	12,071	−55.7	....
175	259	12,821	−57.2	....	264	12,705	−56.4	....	209	12,760	−56.4	....	274	12,708	−55.6	....	239	13,124	−55.7	....	274	13,201	−60.3	....	221	12,915	−57.6	....
150	208	13,776	−58.0	....	222	13,669	−56.8	....	....	....	....	....	225	13,687	−56.0	....	177	14,077	−62.5	....	191	14,152	−65.5	....	174	13,883	−59.9	....
125	137	14,920	−58.8	....	161	14,824	−57.7	....	....	....	....	....	171	14,924	−57.4	....	85	15,198	−65.8	....	....	....	....	....	....	....	....	....

Standard pressure surface (mb.)	Sault Ste. Marie, Mich. (989.2 mb)				Spokane, Wash (945.1 mb.)				Swan Island, W. I. (1,013.0 mb.)				Tacubaya, Mexico (774.2 mb.)				Tampa, Fla.[3] (1,017.8 mb.)				Tatoosh Island, Wash. (1,013.0 mb.)				Toledo, Ohio (904.2 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	350	221	3.9	83	363	598	10.7	63	362	10	25.9	81	362	2,306	15.8	61	353	9	21.2	84	364	31	9.2	86	363	191	9.5	75
1,000	350	132	(*)	....	363	122	(*)	....	362	124	25.1	82	362	65	(*)	....	353	159	21.0	80	364	138	8.6	84	363	142	(*)	....
950	350	555	4.4	75	363	556	(*)	....	362	578	21.8	82	362	527	(*)	....	353	603	18.9	75	364	565	7.0	79	363	570	9.8	66
900	350	990	2.7	72	363	1,004	9.1	58	362	1,042	18.8	77	362	1,003	(*)	....	353	1,066	16.4	73	364	1,004	4.9	75	363	1,017	7.7	64
850	350	1,451	.6	69	363	1,475	5.7	60	362	1,532	16.0	73	362	1,499	(*)	....	353	1,551	13.8	68	364	1,469	2.5	71	363	1,487	5.5	61
800	350	1,936	−1.4	64	363	1,968	2.3	63	362	2,045	13.4	64	362	2,027	(*)	....	353	2,060	11.5	58	364	1,957	.1	65	363	1,981	3.2	58
750	350	2,454	−3.2	56	361	2,490	−1.3	64	362	2,591	10.7	56	362	2,578	13.9	61	353	2,600	8.9	56	364	2,477	−2.6	60	362	2,506	.9	54
700	349	2,991	−5.9	54	361	3,033	−4.8	63	362	3,159	7.7	52	362	3,153	9.6	65	353	3,166	5.9	....	364	3,015	−5.5	57	361	3,054	−1.8	50
650	346	3,575	−8.8	52	361	3,616	−8.2	58	362	3,770	4.4	....	362	3,768	5.1	72	353	3,771	2.6	....	363	3,597	−8.8	55	354	3,644	−4.8	46
600	343	4,184	−12.1	50	359	4,230	−11.9	56	353	4,414	1.0	....	360	4,414	.5	75	353	4,412	−1.2	....	362	4,209	−12.3	53	353	4,268	−8.2	44
550	341	4,848	−16.0	44	356	4,892	−16.0	54	350	5,107	−3.1	....	355	5,109	−3.7	70	351	5,099	−5.2	....	355	4,871	−16.4	53	352	4,938	−12.2	....
500	339	5,556	−20.5	....	354	5,602	−20.8	55	345	5,857	−7.7	....	354	5,856	−8.1	61	348	5,843	−9.8	....	352	5,579	−20.9	56	352	5,661	−16.7	....
450	337	6,334	−25.7	....	354	6,379	−26.2	56	343	6,678	−12.8	....	349	6,677	−13.0	....	346	6,654	−15.1	....	347	6,355	−26.0	....	350	6,450	−22.1	....
400	334	7,172	−31.6	....	352	7,215	−32.2	....	343	7,559	−18.9	....	348	7,556	−18.8	....	345	7,528	−21.3	....	343	7,195	−31.8	....	350	7,302	−28.1	....
350	328	8,105	−38.2	....	348	8,143	−39.0	....	342	8,539	−26.1	....	342	8,537	−26.1	....	339	8,498	−28.6	....	334	8,127	−38.4	....	342	8,245	−35.0	....
300	325	9,149	−45.2	....	341	9,185	−46.4	....	338	9,635	−34.6	....	334	9,634	−34.7	....	333	9,553	−37.0	....	318	9,174	−45.3	....	337	9,302	−42.6	....
250	311	10,348	−51.3	....	325	10,376	−53.4	....	334	10,882	−44.4	....	323	10,881	−44.7	....	329	10,818	−46.7	....	290	10,374	−51.7	....	318	10,515	−50.2	....
200	279	11,789	−54.0	....	299	11,793	−56.1	....	325	12,338	−55.8	....	281	12,338	−56.1	....	313	12,262	−57.3	....	232	11,796	−53.9	....	293	11,954	−56.0	....
175	249	12,646	−54.3	....	235	12,638	−54.6	....	292	13,177	−61.8	....	203	13,176	−61.9	....	304	13,095	−62.0	....	185	12,668	−52.6	....	264	12,802	−57.0	....
150	218	13,644	−55.0	....	184	13,621	−54.4	....	237	14,120	−67.7	....	....	....	....	....	235	14,041	−65.9	....	....	....	....	....	220	13,779	−58.4	....
125	162	14,833	−55.9	....	137	14,791	−55.3	....	98	15,239	−72.6	....	....	....	....	....	158	15,142	−69.5	....	....	....	....	....	147	14,944	−60.2	....

Standard pressure surface (mb.)	Washington, D. C. (1,015.8 mb.)				Standard pressure surface (mb.)	Washington, D. C. (1,015.8 mb.)			
	Number of observations	Height	Temperature	Relative humidity		Number of observations	Height	Temperature	Relative humidity
Surface	362	25	13.5	70	500	349	5,705	−15.7	....
1,000	362	156	13.4	66	450	346	6,497	−21.0	....
950	362	590	11.6	63	400	343	7,353	−27.0	....
900	362	1,038	9.2	63	350	345	8,301	−34.0	....
850	362	1,511	7.0	61	300	340	9,360	−41.9	....
800	362	2,008	4.9	57	250	333	10,575	−50.1	....
750	362	2,537	2.4	54	200	295	12,011	−57.1	....
700	362	3,087	−.4	50	175	255	12,850	−58.8	....
650	357	3,680	−3.6	47	150	227	13,814	−60.6	....
600	356	4,306	−7.0	....	125	150	14,950	−62.0	....
550	354	4,981	−11.0	....					

NOTE.—All data for Table 1 and Table 2 are based on observations for 12 months. At some stations the data for higher levels were not available during 1 or 2 months. Data are not published for any level where observations were missing for more than 1 month in the same season or more than 2 months during the year.

(*) Temperature and relative humidity data for this level are not available or are available only for certain days. See note entitled "Change in Summarization of Radiosonde Data," p. 6, in the January 1946 issue of the MONTHLY WEATHER REVIEW.

[1] January observations taken at St. Louis.

[2] Station elevation changed from 1,415 m. to 1,474 m., March 27, 1946.
[3] Insufficient observations.
[4] Station elevation changed from 343 m. to 360 m., July 20, 1946.
[5] Station elevation changed from 1,632 m. to 1,696 m., May 29, 1946.
[6] Station elevation changed from 79 m. to 14 m., July 21, 1946.
[7] Station elevation changed from 2 m. to 6 m., December 6, 1946.
[8] Station elevation changed from 3 m. to 9 m., June 8, 1946.

TABLE 2A.—*Free-air resultant winds based on pilot balloon observations made near 5 p. m., E. S. T. (2200 G. C. T.) during the year 1946. Directions given in degrees from north (N=360°, E=90°, S=180°, W=270°). Velocities in meters per second*

Altitude (meters) m. s. l.	Abilene, Tex. (534 m.)			Albuquerque, N. Mex. (1,630 m.)			Atlanta, Ga. (299 m.)			Billings, Mont. (1,095 m.)			Bismarck, N. Dak. (512 m.)			Boise, Idaho (868 m.)			Brownsville, Tex. (7 m.)			Buffalo, N. Y. (220 m.)			Burlington, Vt. (100 m.)			Charleston, S. C. (16 m.)			Cincinnati, Ohio (150 m.)			Denver, Colo. (1,627 m.)			El Paso, Tex. (1,198 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	357	164	2.6	363	232	2.1	341	267	0.8	353	279	1.9	354	276	1.6	360	327	1.8	349	125	4.3	343	247	3.1	309	255	1.5	352	184	0.5	332	239	1.0	352	360	0.8	355	227	1.6
500							341	259	0.7										349	134	5.5	343	250	4.9	309	238	3.6	351	203	1.9	332	231	2.3						
1,000	357	177	3.2				339	250	1.4				351	284	3.0	360	324	1.8	305	146	4.6	313	251	6.4	298	257	5.2	327	245	2.5	316	239	3.8						
1,500	345	197	3.3				326	257	2.6	353	274	3.8	321	278	4.5	360	292	2.1	275	167	3.3	262	261	7.1	259	269	7.4	304	263	4.0	286	256	5.3				355	226	2.2
2,000	330	220	4.0	363	236	2.7	305	271	3.8	346	274	5.2	299	277	6.2	355	273	3.0	249	184	2.4	220	267	7.8	221	276	9.4	280	273	5.3	249	268	6.6	352	345	0.6	354	228	2.3
2,500	315	241	5.1	361	244	3.2	275	275	5.1	330	274	6.4	277	279	7.7	337	264	4.2	224	200	2.2				169	282	10.9	262	274	6.3	212	277	7.3	343	272	1.0	346	236	3.2
3,000	298	250	6.4	358	257	4.2	247	276	6.1	311	273	7.7	262	283	9.5	319	260	4.8	205	220	2.3							251	276	7.1	180	281	8.1	326	268	2.6	340	248	4.5
4,000	274	260	8.2	332	271	6.9	190	283	7.2	258	276	10.1	222	283	12.2	283	260	6.8	176	242	3.4							214	276	8.8				309	274	6.5	319	255	6.7
5,000	246	267	9.5	303	267	9.4				224	276	12.3	199	284	14.2	251	266	8.9	150	248	5.0							178	274	10.5				275	275	10.4	288	255	8.2
6,000	219	266	10.6	282	265	10.4				183	277	14.2	162	285	17.0	214	266	10.1										151	276	12.8				245	273	12.8	229	256	9.6
8,000	142	267	10.3	230	267	12.0																												156	270	16.7			
10,000				178	265	15.0																																	

Altitude (meters) m. s. l.	Ely, Nev. (1,910 m.)			Grand Junction, Colo. (1,475 m.)			Greensboro, N. C. (271 m.)			Havre, Mont. (767 m.)			Jacksonville, Fla. (16 m.)			Joliet, Ill. (178 m.)			Las Vegas, Nev. (575 m.)			Little Rock, Ark. (88 m.)			Medford, Oreg. (416 m.)			Miami, Fla. (12 m.)			Mobile, Ala. (66 m.)			Nashville, Tenn. (194 m.)			New York N. Y. (15 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	360	219	1.5	361	270	2.4	335	233	0.7	348	270	2.2	351	83	1.7	342	225	2.0	365	160	0.9	341	164	1.1	351	307	1.4	362	117	2.8	334	143	0.5	350	237	1.2	344	257	1.5
500							335	240	1.4				351	123	1.1	342	231	2.8				341	191	1.6	351	303	1.4	362	110	4.0	334	183	0.9	350	225	2.0	342	261	3.5
1,000							333	245	2.5	348	266	4.0	321	219	1.5	313	237	4.6	365	181	1.5	318	216	2.2	351	283	1.3	359	111	2.7	297	254	1.0	333	235	2.8	320	276	5.5
1,500				361	271	2.4	321	262	3.6	347	274	5.7	302	245	3.1	289	258	6.1	365	199	1.9	302	243	3.1	345	235	1.9	348	117	1.4	271	287	1.7	321	252	3.7	296	285	7.3
2,000	360	222	1.7	361	269	2.4	300	275	5.3	332	275	6.6	284	254	4.1	261	268	7.7	359	217	2.7	274	265	4.1	326	231	2.9	327	144	0.4	250	285	3.0	301	264	4.7	258	290	8.4
2,500	360	230	2.7	356	247	2.8	274	286	7.2	285	272	8.0	258	267	5.1	231	275	8.8	354	231	3.2	250	270	5.7	288	226	3.1	296	214	0.8	217	287	3.7	284	275	5.8	222	289	9.3
3,000	342	240	3.3	347	243	4.1	257	287	8.7	240	273	8.9	241	267	5.8	197	286	9.7	345	243	3.5	232	275	6.7	264	231	3.5	286	225	1.1	198	285	4.7	270	277	6.8			
4,000	302	260	5.0	316	259	6.3	223	286	11.4	176	278	9.2	201	270	7.5				319	258	5.2	194	278	9.8	232	250	5.1	244	256	1.8				231	278	9.8			
5,000	258	267	7.6	266	264	7.9	191	283	12.7				167	274	8.6				306	263	7.0	166	284	11.1				211	267	2.8				193	283	12.3			
6,000	232	272	9.9	230	266	10.0	155	284	13.9										286	265	8.9							191	267	4.5				160	283	13.5			
8,000	172	280	12.9																231	265	11.7																		

Altitude (meters) m. s. l.	Oakland, Calif. (8 m.)			Oklahoma City, Okla. (396 m.)			Omaha, Nebr. (306 m.)			Phoenix, Ariz. (338 m.)			Rapid City, S. Dak. (982 m.)			St. Louis, Mo. (181 m.)			St. Paul, Minn. (225 m.)			San Antonio, Tex. (240 m.)			San Diego, Calif. (13 m.)			Sault Ste. Marie, Mich. (225 m.)			Seattle, Wash. (116 m.)			Spokane, Wash. (603 m.)			Washington, D. C. (24 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	358	268	4.0	341	185	2.9	352	205	0.8	365	238	0.7	347	343	1.7	344	201	1.1	342	246	1.3	355	119	2.2	352	264	3.4	302	276	2.2	345	229	1.8	350	228	1.7	337	246	1.3
500	356	289	3.3	341	186	3.3	352	210	1.5	365	242	1.2				344	222	2.4	342	251	2.8	355	126	2.5	352	279	2.6	302	266	2.9	343	221	3.1				336	250	2.8
1,000	331	301	2.2	336	193	4.1	335	220	3.1	364	239	1.7	347	341	1.7	324	230	3.9	321	242	3.6	344	146	2.8	325	280	1.2	267	268	4.4	308	218	3.7	350	224	3.1	321	261	4.2
2,000	311	300	2.1	323	216	4.5	302	241	5.0	362	221	1.9	346	312	2.9	306	251	5.1	295	258	5.4	306	173	2.6	311	290	0.7				270	217	3.5	318	233	3.9	306	272	6.2
2,500	306	295	2.3	298	236	5.4	280	257	6.8	357	218	2.2	330	289	3.9	285	262	6.6	265	268	7.5	276	200	2.8	298	288	0.9				232	222	3.8	288	243	4.2	288	281	8.1
2,500	298	290	2.7	287	248	6.6	266	267	8.3	355	225	2.7	308	280	5.8	267	270	7.9	242	277	8.9	242	227	3.5	284	279	1.6				206	236	3.9	242	245	5.1	270	284	9.9
3,000	295	289	3.3	268	258	7.6	251	274	10.0	349	234	3.4	281	280	8.0	247	277	9.1	210	282	10.5	228	242	4.1	273	284	2.5				182	247	4.4	201	253	5.2	255	284	11.0
4,000	275	282	5.1	233	268	10.0	222	280	13.0	331	250	5.2	259	280	10.9	205	283	11.8	183	286	13.8	202	258	5.8	242	282	4.3										225	285	13.2
5,000	249	284	6.6	200	275	12.1	193	284	14.8	317	255	6.7	217	279	13.6	182	288	12.5	154	284	14.9				221	277	5.7										188	285	14.8
6,000	232	284	7.9	166	278	13.4	148	286	17.2	286	261	7.9	181	278	15.6	143	295	14.4							192	272	7.0										142	286	17.0
8,000										218	267	9.6																										

See footnote at end of table 1A.

TABLE 3A.—*Maximum free-air wind velocities (m. p. s.) for different sections of the United States based on pilot balloon observations during the year 1946*

Section	Surface to 2,500 meters (m. s. l.)					2,501 to 5,000 meters (m. s. l.)					Above 5,000 meters (m. s. l.)				
	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station
Northeast [1]	{63.2	nw.	1,542	Jan. 26	Caribou, Maine	64.8	wsw.	4,912	Dec. 31	Caribou, Maine	116.1	w.	19,837	Sept. 5	Caribou, Maine.
	{63.2	wnw.	1,917	Jan. 14	Portland, Maine	77.0	sw.	5,000	Feb. 14	Huntington, W. Va.	118.0	w.	7,782	Mar. 9	Huntington, W. Va.
East-Central [2]	53.8	sw.	1,489	Feb. 14	Raleigh, N. C.	61.0	wsw.	4,961	Feb. 10	Charleston, S. C.	65.0	wnw.	16,001	Apr. 29	Charleston, S. C.
Southeast [3]	50.0	n.	2,476	Dec. 21	Charleston, S. C.	59.0	nnw.	4,702	Feb. 14	International Falls, Minn.	92.1	n.	10,033	Oct. 31	Green Bay, Wis.
North-Central [4]	59.4	sw.	1,362	Apr. 19	Alpena, Mich.	64.0	wsw.	3,552	Dec. 8	Indianapolis, Ind.	88.0	sw.	10,963	Dec. 31	Goodland, Kans.
Central [5]	53.5	wsw.	2,500	Oct. 26	Sioux City, Iowa	57.1	wnw.	4,020	Mar. 29	Little Rock, Ark.	104.0	wnw.	14,063	Nov. 12	Little Rock, Ark.
South-Central [6]	44.5	wnw.	2,200	Feb. 9	Del Rio, Tex.	60.0	wsw.	5,000	Dec. 15	Tatoosh Is., Wash.	124.0	wsw.	12,883	July 22	Tatoosh Is., Wash.
Northwest [7]	46.5	sw.	1,884	May 7	Burns, Oreg.	66.0	w.	3,587	Feb. 25	Cheyenne, Wyo.	{82.0	n.	8,942	Oct. 10	Salt Lake City, Utah.
West-Central [8]	56.4	wnw.	2,489	Dec. 23	Cheyenne, Wyo.	60.0	wsw.	4,557	Mar. 31	Raton, N. Mex.	{82.0	s.	11,600	Dec. 24	Oakland, Calif.
Southwest [9]	45.2	wnw.	2,500	Dec. 29	El Paso, Tex.						82.5	sw.	7,789	Nov. 8	Winslow, Ariz.

[1] Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and northern Ohio.
[2] Delaware, Maryland, Virginia, West Virginia, southern Ohio, Kentucky, eastern Tennessee, and North Carolina.
[3] South Carolina, Georgia, Florida, and Alabama.
[4] Michigan, Wisconsin, Minnesota, North Dakota, and South Dakota.
[5] Indiana, Illinois, Iowa, Nebraska, Kansas, and Missouri.
[6] Mississippi, Arkansas, Louisiana, Oklahoma, Texas (except El Paso), and western Tennessee.
[7] Montana, Idaho, Washington, and Oregon.
[8] Wyoming, Colorado, Utah, northern Nevada, and northern California.
[9] Southern California, southern Nevada, Arizona, New Mexico, and extreme west Texas.

NOTE: Due to questionable evaluations from low-angle rawin readings, the values shown for maximum winds are in some cases subject to error.

RIVER STAGES AND FLOODS FOR DECEMBER 1946

C. R. JORDAN

Precipitation during December was above normal over a broad strip extending from southern California through Utah, Wyoming, western Montana, and eastern Idaho. It was also wetter than usual in the South-Central States, in the northern Lake region, and in northern New England. Less than half the usual precipitation occurred in the south Atlantic and east Gulf Coastal Plains, and in large portions of Colorado, New Mexico, Arizona, eastern Washington, and eastern Oregon.

Stream flow was generally above normal except in the eastern States. Floods occurred in the Arkansas and Red River basins in Arkansas and Oklahoma and in the far Northwest.

Floods in Arkansas and Oklahoma.—Flooding was quite general about the middle of the month in Arkansas, Oklahoma, and eastern Texas. Most tributaries of the Arkansas River below Muskogee, Okla., including the Arkansas River from Fort Smith to Morrilton, Ark., exceeded flood stage by a few feet. Damage was not great. Some damage was reported to the spinach crop in southeastern Oklahoma, where nearly 2,400 acres of spinach were overflowed in Haskell and Sequoyah Counties.

Light flood stages were reached in several tributaries of the Red River, resulting in flood stage on the Red River at Fulton, Ark.

West Gulf of Mexico Drainage.—Flood stages were reached on the Sabine, Neches, and Trinity Rivers. Flooding was not severe but total run-off for the month was high. Run-off of the Neches River at Evadale, Tex., was the third highest December run-off in 27 years of record according to the U. S. Geological Survey.

Columbia Basin.—Floods occurred in scattered areas in Oregon and Washington as a result of snow melt and heavy rainfall during the first 2 weeks of the month. Overflow was chiefly in the Umatilla River basin and the Willamette River from Eugene to Portland, Oreg. Reports of this flood are incomplete; they will be included in the report in the next issue of the REVIEW.

FLOOD STAGE REPORT FOR DECEMBER 1946

[All dates in December unless otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest [1]	
		From—	To—	Stage	Date
EAST GULF OF MEXICO DRAINAGE					
Tombigbee: Lock No. 3, Ala.	*Feet* 33	22	25	*Feet* 36.8	24
MISSISSIPPI SYSTEM					
Ohio Basin					
West Fork: Edwardsport, Ind.	12	14	14	12.0	14

FLOOD STAGE REPORT FOR DECEMBER 1946—Continued

[All dates in December unless otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest [1]	
		From—	To—	Stage	Date
White Basin					
Black: Black Rock, Ark.	*Feet* 14	11	17	*Feet* 15.9	14
White:					
Cotter, Ark.	21	14	14	21.0	14
Calico Rock, Ark.	19	12	15	24.9	13
Batesville, Ark.	23	11	16	29.6	13
Newport, Ark.	26	14	18	28.2	16
Augusta, Ark.	32	15	22	33.3	18
Georgetown, Ark.	21	14	27	24.5	19–20
Des Arc, Ark.	24	18	27	29.7	21–22
Clarendon, Ark.	26	19	Jan. 5	28.6	24–25
St. Charles, Ark.	25	23	Jan. 8	26.5	28–29
Arkansas Basin					
Poteau: Poteau, Okla.	21	10		33.5	13
Petit Jean: Danville, Ark.	20	11	21	25.0	13
Fourche LaFave:					
Perryville, Ark.	20	Nov. 28	1	23.6	Nov. 30
		11	29	31.8	13
Houston, (nr.), Ark.	18	Nov. 29	1	20.3	Nov. 30
		11	29	28.2	13
Arkansas:					
Fort Smith, Ark.	22	10	15	26.6	13
Van Buren, Ark.	22	10	15	27.9	13
Ozark, Ark.	22	12	14	23.3	13
Dardanelle, Ark.	22	11	16	26.8	13
Morrilton, Ark.	20	12	15	21.1	14
Red Basin					
Ouachita:					
Arkadelphia, Ark.	17	12	15	22.1	13
Camden, Ark.	26	15	19	28.7	17
Clear Boggy: Caney, Okla.	21	11	15	25.2	12
Muddy Boggy: Farris, Okla.	38	12	14	39.4	12
Little: Whitecliffs, Ark.	25	14	19	27.6	16
Sulphur:					
Ragansport, Tex.	38	10	17	41.3	13
Naples, Tex.	22	14	23	27.5	16
Texarkana, (nr.), Tex.	22	19	30	25.4	22
Red: Fulton, Ark.	25	14	20	27.4	17
WEST GULF OF MEXICO DRAINAGE					
Sabine:					
Mineola, Tex.	14	12	20	17.7	16
Gladewater, Tex.	26	20	24	29.6	22
Logansport, La.	25	Nov. 18	3	32.2	22
Bon Wier, Tex.	17	Nov. 29	8	17.3	5
		11	13	17.3	12
Neches: Evadale, Tex.	16	Nov. 28	3	16.1	1
East Fork: Rockwall, (nr.), Tex.	10	11	17	19.9	12
Trinity:					
Dallas, Tex.	28	11	16	38.6	13
Rosser, Tex.	26	13	21	35.0	16
Trinidad, Tex.	28	14	26	39.9	19
Long Lake, Tex.	40	24	27	40.9	25
Liberty, Tex.	24	Nov. 5	2	27.2	Nov. 10
				27.3	Nov. 13
				27.2	Nov. 29
		29	Jan. 6	25.6	Jan. 1–4
PACIFIC SLOPE DRAINAGE					
Columbia Basin					
Coeur d'Alene: Cataldo, Idaho	40.3	14	17	44.6	16
Spokane: Spokane, Wash.	24.4	17	22	25.4	19

[1] Provisional.

CLIMATOLOGICAL DATA FOR DECEMBER 1946

CONDENSED CLIMATOLOGICAL SUMMARY OF TEMPERATURE AND PRECIPITATION BY SECTIONS

[For description of tables and charts, see Review, January 1943, p. 15]

In the following table are given for the various sections of the climatological service of the Weather Bureau the monthly average temperature and total rainfall; the stations reporting the highest and lowest temperatures, with dates of occurrence; the stations reporting the greatest and least total precipitation; and other data as indicated by the several headings.

The mean temperature for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperatures and precipitation are based only on records from stations that have 10 or more years of observations. Of course, the number of such records is smaller than the total number of stations.

Section	Temperature								Precipitation					
			Monthly extremes								Greatest monthly		Least monthly	
	Section average	Departure from the normal	Station	Highest	Date	Station	Lowest	Date	Section average	Departure from the normal	Station	Amount	Station	Amount
	°F.	°F.		°F.			°F.		In.	In.		In.		In.
Alabama	52.1	+4.4	2 stations	84	[1] 27	Fayette	20	3	2.74	−2.54	Village Springs	9.08	Coffee Springs	0.23
Arizona	46.4	+3.5	Sells	86	4	Fort Valley	−18	29	1.02	−.26	Sierra Ancha	3.25	Leupp	.00
Arkansas	48.3	+5.5	Gilbert	81	6	2 stations	4	30	4.18	−.05	Cove	9.06	Index	1.70
California	46.0	+.2	3 stations	87	2	Gem Lake	−15	31	2.92	−1.00	Mount Wilson A. S.	12.17	Borego Valley	.08
Colorado	31.4	+5.5	Eversoll Ranch	78	4	Taylor Park	−40	31	.40	−.48	Wolf Creek Pass	3.50	5 stations	.00
Florida	64.1	+4.2	Stuart	89	8	Jasper	27	26	1.04	−1.73	West Palm Beach	6.75	Palatka	.03
Georgia	51.3	+3.6	Cordele	83	29	Blairsville	16	19	1.17	−3.10	LaFayette	4.71	Doctortown	.15
Idaho	31.2	+4.6	Payette	63	14	Island Park Dam	−25	[1] 17	2.29	+.22	Roland	11.82	Aberdeen	.21
Illinois	36.5	+5.5	Pana	73	7	Freeport	−16	31	2.23	+.13	Chicago Heights	3.92	Stockton	.99
Indiana	36.8	+4.6	Scottsburg	71	9	South Bend	−2	31	2.87	+.15	La Porte	4.95	Collegeville	1.29
Iowa	29.5	+5.3	Centerville	73	8	2 stations	−27	31	.63	−.56	Keokuk	2.88	Bedford	.01
Kansas	38.7	+5.6	2 stations	78	4	Burr Oak	−12	[1] 30	.57	−.32	Valley Falls	3.18	22 stations	T
Kentucky	42.3	+4.6	Greenville	77	27	Headquarters	7	2	3.19	−.60	Mayfield	4.52	Scottsville	2.07
Louisiana	56.1	+3.6	2 stations	83	[1] 8	2 stations	18	30	3.54	−1.78	Winnfield	7.67	Kinder	1.20
Maryland-Delaware	37.8	+2.6	Millsboro, Del.	76	27	Oakland, Md.	1	3	2.20	−.99	Coleman, Md.	4.52	Georgetown, Del.	1.17
Michigan	26.8	+1.2	Three Rivers	65	7	Dunbar Forest	−29	30	2.62	+.58	White Pine	5.14	Detour	1.01
Minnesota	15.6	−.2	Albert Lea	62	8	2 stations	−49	31	.83	+.07	Grand Marais	2.46	Pipestone	.04
Mississippi	52.1	+3.8	2 stations	80	9	Scott	19	30	3.18	−2.11	Magnolia	5.83	Shelby	1.15
Missouri	40.2	+6.0	3 stations	77	6	Conception	−8	30	2.44	+.26	Hailey	5.66	Tarkio	.02
Montana	24.4	+1.0	3 stations	63	[1] 4	West Yellowstone	−36	17	1.40	+.45	Trout Creek	7.22	Dillon Airport	.08
Nebraska	31.6	+4.5	Alma	74	15	2 stations	−25	29	.18	−.49	Newcastle	.89	3 stations	.00
Nevada	36.4	+4.9	Overton	72	3	Wells	−12	31	.80	−.19	Pioche	1.86	Wellington	.05
New England	27.5	+1.1	Waterbury, Conn.	70	10	Fort Kent, Maine	−23	30	3.73	+.39	Searsburg Sta., Vt.	6.78	Salisbury, Conn.	1.43
New Jersey	36.5	+2.9	3 stations	74	10	Layton	2	27	2.38	−1.15	Hammonton	3.68	Moorestown	1.10
New Mexico	39.0	+4.7	Pearl (nr.)	84	15	Eagle Nest	−27	30	.35	−.36	Mogollon	1.65	24 stations	.00
New York	29.3	+2.6	3 stations	70	10	2 stations	−26	27	3.16	+.22	Lyons Falls	8.50	Burdett	.87
North Carolina	46.2	+3.7	Chapel Hill	84	28	Mount Mitchell	4	2	2.06	−1.76	Tapoco	6.12	Wadesboro	.73
North Dakota	13.3	−.1	2 stations	55	[1] 3	Parshall	−35	20	.53	+.11	Trotters	1.67	Belcourt	.10
Ohio	35.4	+3.8	2 stations	71	9	Mansfield	4	19	2.51	−.19	Irwin	3.60	Mineral Ridge	1.72
Oklahoma	45.7	+5.7	2 stations	80	[1] 5	Kenton	−4	[1] 29	2.81	+1.10	McAlester	10.26	Guymon	T
Oregon	36.3	+2.6	Lake Creek	71	1	Olive Lake	−11	30	3.23	−.63	Valsetz	25.19	Prineville	.09
Pennsylvania	33.5	+2.3	Lewistown	75	9	Coudersport	−4	3	2.30	−.78	Bradford	4.75	Hop Bottom	1.27
South Carolina	50.4	+3.8	Walterboro	82	12	Caesars Head	11	3	1.26	−2.33	Caesars Head	4.17	Blackville	T
South Dakota	24.5	+2.5	Ardmore	68	4	Ralph	−31	29	.38	−.13	Dumont	1.34	2 stations	T
Tennessee	45.2	+4.5	Gatlinburg	80	12	Rugby	11	4	4.03	−.50	Dickson	6.00	Ashwood	2.40
Texas	52.6	+3.7	4 stations	89	[1] 7	2 stations	0	[1] 29	1.96	−.36	McKinney	6.08	Stratford	T
Utah	33.6	+6.3	Farmington	68	6	Moon Lake	−23	31	1.60	+.48	2 stations	5.42	Mexican Hat	.04
Virginia	41.9	+3.9	Saluda	78	10	Monterey	1	3	2.13	−.93	Emory	4.60	2 stations	.85
Washington	33.9	+.5	Richland	69	9	Stockdill Ranch	−17	28	5.57	−.08	Peterson's Ranch	26.29	3 stations	.04
West Virginia	38.2	+3.6	2 stations	77	[1] 9	Canaan Valley	−6	3	2.44	−.83	Pickens No. 2	4.29	McNeill	1.11
Wisconsin	23.1	+2.5	Kenosha	66	8	Danbury	−42	31	1.41	+.12	Shawano	2.48	Ladysmith	.36
Wyoming	28.9	+6.6	2 stations	70	[1] 3	Bondurant	−38	30	.65	−.07	Bechler River	4.86	Carpenter	T
Alaska, (Nov)	12.0	−2.1	Lincoln Rock	60	12	Fort Yukon	−45	30	2.41	−.31	Little Port Walter	23.99	Candle	.10
Hawaii	69.4	−.6	Hana	89	[1] 26	Haleakala R. S.	40	3	18.15	+9.90	Kukui	82.00	Kiolakaa	.16
Puerto Rico	74.4	+.2	2 stations	93	6	Guineo Reservoir	52	25	3.97	−.24	Rio Blanco	14.40	Juana Diaz Camp	.49

[1] Other dates also.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS FOR DECEMBER 1946

District and station	Elevation of instruments: Barometer above sea level	Thermometer above ground	Anemometer above ground	Pressure: Station	Sea level	Departure from normal	Temperature of the air: Mean	Departure from normal	Maximum	Date	Mean max. minim.	Minimum	Date	Mean minimum	Greatest daily range	Total degree days	Mean temperature of the dew point	Mean relative humidity	Precipitation: Total	Departure from normal	Greatest in 24 hours	Days with 0.01 inch or more	Wind: Average hourly velocity	Prevailing direction	Maximum velocity: Miles per hour	Direction	Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month	Number of days with thunderstorms
NEW ENGLAND	*Ft.*	*Ft.*	*Ft.*	*Mb.*	*Mb.*	*Mb.*	° *F.*	° *F.*	°*F.*			° *F.*			° *F.*		° *F.*	%	*In.*	*In.*	*In.*		*Mi.*								*0–10*	*In.*	*In.*	
Eastport	75	67	85	1,012.2	1,015.2	0.0	30.4	+1.8	54	13	35	−9	27	18	38	1,191	20	74	3.70	+.3	2.35	18	12.7	nw.	35	nw.	26	6.8	8	18	6.7	21.1	4.0	0
Greenville, Maine	1,070	6	41	974.6	1,015.9	.....	26.6	+.3	54	13	36	−9	27	18	38	1,191	20	75	5.93	+2.2	2.35	18	12.7	nw.	35	nw.	26	8	5	18	6.7	21.1	4.0	0
Portland, Maine	103	5	43	1,012.2	1,016.3	−.3	26.6	+1.6	56	13	36	−10	31	17	33	1,187	18	78	4.49	+.5	2.43	12	9.5	w.	48	w.	26	7	9	15	6.2	29.4	13.9	1
Concord	289	4	45	1,005.8	1,016.9	−1.1	25.2	+1.2	60	10	36	−12	31	15	37	1,235	18	74	3.62	+.5	1.45	8	7.9	nw.	33	w.	26	5	11	15	6.6	23.4	13.9	0
Burlington	403	6	51	1,000.7	1,015.9	−1.7	25.9	+1.5	56	13	34	−9	31	17	45	1,209	20	78	2.13	+.2	.60	14	11.8	s.	38	s.	17	5	5	21	7.7	23.3	13.0	0
Boston	124	33	62	1,012.2	1,016.9	−.7	34.8	+2.3	63	10	43	8	27	26	31	940	23	64	3.60	+.2	2.23	9	12.7	w.	35	nw.	26	4	12	15	6.9	4.9	3.4	0
Nantucket	12	4	34	1,016.6	1,017.3	−.3	37.8	+2.0	59	1	46	14	27	29	31	846	30	74	3.85	+.1	1.94	10	15.4	nw.	44	nw.	26	3	12	16	6.7	2.0	.0	0
Block Island	26	11	46	1,016.3	1,017.3	−.7	38.8	+2.8	62	10	46	16	27	31	31	809	30	73	3.23	−.6	2.19	8	20.2	nw.	49	nw.	2	5	13	13	6.5	2.1	.0	0
Providence	159	46	60	1,011.2	1,017.3	−.7	35.6	+4.0	67	10	44	10	27	27	31	915	22	67	3.84	+.5	2.48	8	9.7	nw.	42	sw.	13	4	15	12	7.0	3.4	.2	0
Hartford	159	5	44	1,012.2	1,018.3	.0	32.3	+2.5	67	10	42	6	31	22	33	1,013	23	74	2.84	−1.1	2.01	8	8.9	nw.	33	nw.	26	6	9	16	6.9	5.1	1.2	0
New Haven	107	5	39	1,014.6	1,018.6	+.3	34.2	+3.3	61	10	43	13	31	26	32	954	24	69	3.17	−.5	2.31	8	8.5	w.	26	sw.	26	8	10	13	6.5	3.2	T	0
MIDDLE ATLANTIC							40.0	+4.1										70	2.17	−1.1											6.2			
Albany	97	26	40	1,013.9	1,017.6	−1.0	28.4	+2.9	62	10	38	−3	27	19	31	1,134	20	74	2.68	+.1	1.07	10	10.1	w.	32	w.	26	7	9	15	6.6	9.2	3.0	0
Binghamton	871	60	79	987.1	1,018.6	−.4	32.2	+4.0	62	9	41	4	27	23	38	1,017	23	73	1.86	−.4	.85	13	7.5	w.	24	w.	13	1	10	20	7.9	8.3	..	0
New York	314	415	454	1,006.8	1,018.6	−.4	38.2	+3.2	69	10	46	15	31	31	28	832	25	61	2.45	−1.2	1.78	7	17.7	nw.	60	nw.	2	9	10	12	5.8	2.0	.0	0
Harrisburg	374	30	49	1,006.1	1,020.3	+.3	36.4	+3.7	71	10	45	16	2	28	37	887	24	67	1.99	−1.0	1.38	5	7.8	nw.	34	nw.	26	5	11	15	6.7	2.7	.0	0
Philadelphia	114	5	57	1,015.6	1,019.6	.0	39.9	+3.6	66	10	47	16	2	32	31	776	28	70	2.76	−.7	2.15	5	8.1	sw.	37	nw.	2	6	12	13	6.1	T	.0	0
Reading	323	47	306	1,007.8	1,020.0	.....	37.2	+3.0	71	10	45	14	2	29	29	860	.....	...	2.42	−1.1	1.67	5	11.2	sw.	40	nw.	2	6	9	16	6.7	1.9	.0	0
Scranton	805	72	104	989.5	1,019.6	+.3	33.2	+2.5	64	10	41	10	2	25	30	988	.....	...	1.46	−1.6	.90	7	7.8	sw.	30	nw.	2	3	13	15	6.9	3.7	T	0
Atlantic City	52	37	172	1,017.6	1,019.6	+.3	41.7	+5.3	63	1	50	16	3	33	31	719	34	75	1.98	−2.0	1.29	8	16.3	w.	53	se.	21	8	7	16	6.6	.3	.0	0
Trenton	190	89	107	1,012.5	.....	.....	37.8	+3.4	70	10	46	14	2	30	29	842	.....	...	2.36	−1.0	1.71	6	9.4	nw.	36	nw.	2	7	12	12	6.1	1.0	.0	0
Baltimore	123	100	215	1,015.6	1,020.3	.0	42.4	+5.2	74	28	50	20	3	34	41	699	28	64	1.97	−1.4	1.47	8	9.7	sw.	35	sw.	26	13	6	12	5.1	3.2	T	0
Washington	112	56	100	1,016.3	1,020.7	+.4	41.6	+5.0	74	28	51	19	3	32	39	724	28	60	2.02	−1.3	1.44	8	7.5	s.	30	nw.	2	7	7	17	6.5	2.1	.5	0
Cape Henry	18	8	54	1,019.6	1,020.3	.....	48.3	+4.6	76	29	56	30	2	40	27	517	38	72	.85	−2.6	.57	5	13.1	sw.	56	nw.	2	9	16	6	5.2	T	.0	0
Lynchburg	686	4	50	995.6	1,020.7	.0	42.6	+5.3	73	9	53	11	3	32	38	694	30	70	3.38	+.1	1.74	8	8.7	sw.	28	s.	12	11	9	11	5.5	1.0	1.0	0
Norfolk	91	80	125	1,017.6	1,021.0	+.7	48.4	+5.3	75	29	57	26	3	40	31	512	36	76	1.31	−2.0	.80	5	10.0	sw.	34	nw.	2	7	11	13	5.9	.0	.0	0
Richmond	144	11	52	1,014.9	1,020.3	−.4	44.7	+4.9	74	28	56	20	3	34	37	626	31	72	3.08	−.2	1.26	5	7.8	sw.	25	nw.	13	10	10	11	5.5	1.4	2.0	0
SOUTH ATLANTIC							50.8	+4.3										76	1.32	−2.1											5.0			
Asheville	2,253	77	92	940.7	1,022.4	+1.1	42.6	+4.8	69	9	54	20	19	32	39	695	32	74	1.86	−1.3	.71	10	7.7	sw.	27	nw.	1	10	7	14	5.9	.5	.0	0
Charlotte	779	63	86	992.9	1,021.3	.0	47.6	+4.6	74	1	58	23	3	38	32	538	34	72	1.60	−2.2	.56	6	7.3	sw.	34	s.	12	12	4	15	5.3	.0	.0	0
Greensboro	886	6	56	988.8	1,021.7	.....	43.6	+4.4	72	28	56	15	3	32	42	664	33	78	1.80	−2.0	.74	5	8.1	sw.	27	nw.	1	10	6	15	5.9	.0	.0	0
Hatteras	11	5	50	1,020.0	1,020.3	.0	53.8	+3.7	70	12	60	34	2	48	21	350	48	84	2.76	−1.4	2.27	6	13.7	n.	42	n.	2	8	8	15	6.3	.0	.0	4
Raleigh	376	5	69	1,007.5	1,021.3	+.3	47.6	+4.6	76	1	58	19	3	37	35	543	36	80	1.46	−2.1	.89	6	7.4	sw.	26	sw.	22	10	12	9	5.3	.0	.0	0
Wilmington	72	73	107	1,018.6	1,021.3	+.3	52.0	+2.9	76	29	62	25	3	42	31	407	43	78	2.10	−.7	1.77	5	8.9	n.	30	sw.	3	11	12	8	4.8	.0	.0	0
Charleston	48	11	92	1,019.3	1,021.3	+.3	55.0	+3.3	75	11	64	31	3	46	25	313	43	82	.57	−2.2	.31	4	9.4	n.	28	n.	2	17	6	8	4.0	.0	.0	1
Columbia, S. C.	347	70	91	1,008.5	1,021.3	.0	51.8	+4.6	76	1	63	25	3	40	39	409	37	70	.47	−2.6	.21	5	7.7	ne.	29	sw.	12	16	8	7	3.9	.0	.0	0
Greenville, S. C.	1,040	18	36	983.4	1,021.3	.....	47.8	+5.6	74	1	58	25	3	38	34	535	36	71	2.11	−2.7	.65	8	8.8	ne.	34	n.	1	11	6	14	5.5	.0	.0	0
Augusta	182	62	77	1,014.9	1,021.3	.0	51.7	+3.6	78	12	64	29	3	39	38	418	38	68	.33	−2.9	.16	5	5.2	nw.	22	s.	12	16	6	9	4.3	.0	.0	0
Savannah	65	73	152	1,019.0	1,021.7	+.7	55.7	+5.0	78	1	68	32	5	44	34	297	44	78	.49	−2.4	.45	3	8.3	n.	28	nw.	21	14	6	11	4.7	.0	.0	1
Jacksonville	43	86	110	1,019.6	10, 21.0	+.3	60.5	+4.2	79	28	70	39	5	51	29	164	50	84	.14	−2.9	.13	2	7.5	ne.	26	ne.	2	13	8	10	4.8	.0	.0	1
FLORIDA PENINSULA							70.8	+4.0										83	1.18	−.7											4.8			
Key West	21	10	64	1,016.3	1,017.3	−1.3	74.6	+4.3	83	20	79	63	22	70	14	0	67	84	1.31	−.4	.56	8	10.3	ne.	24	e.	2	10	18	3	4.4	.0	.0	2
Miami	25	242	249	1,016.9	1,018.0	−1.6	71.8	+2.7	80	1	76	54	22	68	18	3	64	84	2.13	+.2	.81	12	14.7	ne.	44	ne.	2	9	15	7	5.5	.0	.0	0
Tampa	35	6	43	1,018.6	1,019.6	−.4	66.1	+5.0	82	31	77	42	23	56	30	47	56	82	.99	−2.0	.05	3	7.2	ne.	23	ne.	2	13	9	9	4.6	.0	.0	0
EAST GULF							53.6	+4.0										80	2.02	−2.8											4.5			
Atlantic	1,173	33	72	979.0	1,021.3	.0	48.4	+4.2	70	28	59	26	3	38	32	518	36	70	1.44	−3.4	.54	8	10.3	nw.	31	nw.	21	17	5	9	4.5	.0	.0	0
Macon	370	79	87	1,007.8	1,021.3	.0	51.2	+3.7	77	29	64	28	26	38	39	431	37	67	.33	−3.7	.22	5	6.0	n.	22	sw.	12	19	4	8	4.1	.0	.0	1
Thomasville	274	49	58	1,011.5	1,021.7	+.7	57.0	.....	78	29	70	32	3	45	34	258	.....	...	.24	−4.1	.11	5	.....	.....	...	.....	...	14	9	8	.....	.0	.0	0
Apalachicola	35	11	51	1,019.3	1,020.7	.....	58.8	+3.1	76	1	67	38	3	50	25	212	52	85	.60	−4.5	.32	4	7.4	ne.	28	ne.	2	16	5	10	4.1	.0	.0	2
Pensacola	56	54	79	1,019.3	1,021.3	+.3	57.8	+3.8	78	1	67	37	30	49	27	236	48	80	1.51	−3.1	.81	4	7.6	ne.	29	se.	20	15	8	8	3.9	.0	.0	0
Anniston	741	9	.....	.....	.....	.....	49.4	+4.2	74	28	61	27	26	38	37	484	.....	...	2.95	−2.1	1.04	6	.....	sw.	...	.....	...	18	3	10	.....	.0	.0	0
Birmingham	700	5	62	996.3	1,022.0	+.7	48.9	+4.8	74	28	61	27	19	37	38	500	40	82	3.67	−1.5	1.73	9	8.0	ne.	32	sw.	12	13	7	11	5.0	.0	.0	0
Mobile	57	86	161	1,019.0	1,021.3	+.3	56.4	+4.2	77	12	67	33	30	46	32	284	47	82	2.02	−3.0	.92	8	8.1	n.	27	n.	1	16	5	10	4.3	.0	.0	0
Montgomery	218	92	105	1,013.5	1,021.7	+.4	53.6	+4.2	77	28	65	31	19	42	34	360	42	80	2.06	−2.8	1.07	6	6.8	n.	21	sw.	29	18	4	9	4.0	.0	.0	1
Meridian	375	67	92	1,007.8	1,021.7	+.4	51.4	+3.7	75	28	63	28	30	40	38	427	42	84	3.18	−2.0	1.82	7	6.1	n.	19	s.	27	15	6	10	4.9	.0	.0	1
Vicksburg	247	82	102	1,011.9	1,021.3	+.3	53.9	+3.9	76	9	64	23	30	44	42	357	42	84	3.65	−1.7	1.58	9	9.7	s.	24	n.	1	13	6	12	5.2	T	.0	1
New Orleans	53	50	84	1,018.6	1,020.7	+.4	6.9	.....	79	28	67	34	22	46	33	270	50	83	2.63	−2.2	2.00	8	6.6	se.	21	ne.	2	14	6	11	4.7	.0	.0	1
WEST GULF							55.7	+4.4										79	2.83	−.2											6.0			
Shreveport	249	5	64	1,011.2	1,020.7	+.4	54.1	+6.0	77	28	64	22	30	44	38	353	44	80	3.60	−.6	1.18	9	10.5	s.	34	sw.	11	10	10	11	5.5	T	1.0	2
Fort Smith	463	57	82	1,002.7	1,019.3	−1.0	47.8	+5.7	74	27	58	14	30	38	38	531	38	74	6.31	+3.6	4.40	5	7.8	ne.	28	w.	28	6	11	14	6.7	2.1	2.0	3
Little Rock	357	26	58	1,007.8	1,021.0	+.3	49.2	+5.0	74	28	59	16	30	39	37	491	40	76	3.23	−.9	1.38	6	8.8	sw.	28	nw.	29	7	9	15	6.5	2.5	2.5	1
Austin	605	10	41	998.0	1,019.6	.....	54.9	+3.9	77	28	65	23	30	45	41	333	45	78	2.71	.0	1.49	5	9.6	s.	31	n.	29	9	7	15	6.0	.0	.2	1
Brownsville	57	5	54	1,015.9	1,018.0	.....	64.0	+2.8	84	17	73	32	31	55	33	137	56	86	.38	−1.5	.22	5	10.8	se.	34	n.	29	11	17	7	5.3	.0	.0	0
Corpus Christi	20	4	33	1,018.3	1,019.0	−1.0	60.4	+3.9	82	27	70	30	31	51	36	203	54	85	.73	.....	.45	6	10.6	se.	33	n.	29	11	4	16	6.2	.0	.0	0
Dallas	512	5	45	1,000.7	1,019.6	.....	52.6	+4.9	79	27	63	19	30	42	44	397	42	74	3.78	+1.4	1.81	5	11.5	s.	34	s.	7	12	8	11	5.2	1.7	1.7	1
Fort Worth	679	40	56	994.9	1,019.6	−.4	52.2	+5.7	79	27	63	18	31	41	46	412	41	71	3.40	+1.5	2.02	5	12.1	s.	34	nw.	28	10	10	11	5.3	2.6	2.8	3
Galveston	54	106	114	1,018.0	1,020.0	.0	59.4	+3.0	74	17	65	30	30	54	35	203	54	86	2.26	−1.5	1.09	8	11.8	ne.	29	ne.	29	11	4	16	5.8	.0	.0	1
Houston	138	157	190	1,014.6	1,019.6	.....	59.3	+4.9	78	27	68	27	30	51	41	212	50	83	2.96	−1.3	1.08	9	9.8	se.	29	nw.	29	9	5	17	6.1	.0	.0	1
Palestine	510	64	72	1,002.0	1,020.3	+.3	55.2	+5.3	79	27	64	21	30	46	33	319	44	72	2.74	−.9	.92	7	8.5	s.	34	n.	29	11	6	14	5.9	.0	.0	1
Port Arthur	34	59	134	1,018.6	1,020.0	.....	58.7	+4.0	76	1	67	38	30	51	38	227	50	84	2.22	−3.0	.91	9	13.3	s.	34	n.	29	11	6	14	5.9	.0	.0	1
San Antonio	693	5	51	994.6	1,019.3	−.3	55.8	+2.1	80	28	67	26	31	44	35	306	46	76	2.43	+.8	.99	5	8.4	n.	26	ne.	29	12	3	16	5.7	.0	.0	0
OHIO VALLEY AND TENNESSEE							40.2	+4.8										76	3.24	−.4											6.2			
Chattanooga	762	6	66	993.9	1,022.0	+.7	44.6	+3.7	67	10	56	23	4	33	40	630	36	80	5.00	−.1	1.58	8	7.2	s.	31	nw.	1	8	11	11	26.1	T	.0	1
Knoxville	995	27	53	985.8	1,022.4	+2.1	44.2	+5.2	70	12	54	23	19	34	35	647	34	74	4.41	−.1	1.58	8	8.0	sw.	31	w.	29	9	5	17	6.2	T	.0	1
Memphis	399	5	86	1,006.1	1,021.0	.0	48.6	+6.2	74	28	58	21	30	39	38	510	38	76	3.91	−.6	1.36	7	9.7	s.	37	sw.	28	9	9	13	6.3	T	1.2	1
Nashville	546	5	72	1,001.4	1,021.3	+.3	45.7	+4.7	71	28	56	22	19	36	40	597	35	72	4.04	−.2	1.66	7	9.3	s.	42	w.	29	6	9	16	6.5	2.5	2.5	1
Lexington	989	4	28	984.4	1,021.7	+1.0	40.1	+4.3	66	9	49	13	2	31	34	773	31	75	3.31	−.5	1.07	7	.....	.....	...	.....	...	7	7	17	6.8	1.0	1.0	1
Louisville	525	106	120	1,001.4	1,020.7	.0	41.6	+5.3	69	9	51	17	2	32	35	727	32	72	2.94	−.8	1.13	10	8.7	s.	34	nw.	13	8	7	16	6.9	2.6	.3	0

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS FOR DECEMBER 1946—Continued

District and station	Elevation of instruments: Barometer above sea level	Thermometer above ground	Anemometer above ground	Pressure: Station	Sea level	Departure from normal	Temperature of the air: Mean	Departure from normal	Maximum	Date	Mean maximum	Minimum	Date	Mean minimum	Greatest daily range	Total degree days	Mean temperature of the dew point	Mean relative humidity	Precipitation: Total	Departure from normal	Greatest in 24 hours	Days with 0.01 inch or more	Wind: Average hourly velocity	Prevailing direction	Maximum velocity: Miles per hour	Direction	Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month	Number of days with thunderstorms
OHIO VALLEY AND TENNESSEE—Con.	*Ft.*	*Ft.*	*Ft.*	*Mb.*	*Mb.*	*Mb.*	°*F.*	°*F.*	°*F*		°*F*	°*F.*		°*F.*	°*F.*		°*F.*	%	*In.*	*In.*	*In.*		*Mi.*								*0–10*	*In.*	*In.*	
Evansville [1]	431	11	40	1,004.7	1,021.0	+.7	40.8	+6.0	67	7	51	18	2	31	33	749	33	78	3.00	−.5	.98	9	8.9	s.	29	s.	27	6	5	20	7.0	1.6	.4	0
Indianapolis [1]	823	5	54	988.8	1,019.6	−.4	35.4	+4.5	65	8	44	14	19	27	30	917	28	78	3.03	----	1.19	10	11.3	w.	40	sw.	12	4	11	16	7.0	3.3	.0	1
Terre Haute [2]	575	68	149	999.3	1,020.7	----	37.8	+4.3	66	8	46	16	30	30	31	845	30	82	2.91	.0	1.16	11	10.2	s.	31	sw.	12	7	7	17	6.9	.8	T	1
Cincinnati [2]	627	11	51	997.3	1,021.0	+.7	40.3	+6.9	67	9	49	18	19	32	33	767	30	76	2.91	−.7	1.08	9	7.3	sw.	23	nw.	17	7	8	16	6.8	3.8	.0	0
Columbus [2]	822	90	110	989.8	1,020.3	+.3	36.8	+4.4	64	9	45	14	19	28	38	881	28	76	1.98	−.8	.92	11	10.7	s.	39	sw.	12	8	5	18	6.8	2.1	.0	1
Dayton [1]	1,003	6	55	983.1	1,020.3	----	34.8	+3.5	63	9	44	11	2	26	35	937	28	78	2.78	.0	1.26	11	13.1	sw.	37	w.	29	6	8	17	6.8	4.6	.0	0
Elkins [1]	1,947	4	45	949.9	1,021.3	+1.3	36.0	+4.3	67	9	48	5	3	24	47	903	28	80	3.07	−.4	.79	13	8.1	w.	35	w.	13	5	8	18	7.1	11.9	.4	0
Parkersburg	637	77	84	997.0	1,020.7	.0	40.0	+4.8	68	9	50	14	2	30	39	774	30	70	2.82	−.2	1.01	10	7.4	nw.	26	nw.	1	5	9	17	7.0	1.7	.0	0
Pittsburgh [1]	842	39	54	988.5	1,019.6	.0	36.2	+4.2	64	9	45	12	19	27	40	897	26	70	2.45	−.4	.77	10	12.0	w	40	nw	28	6	5	20	7.4	5.3	.0	1
LOWER LAKES																																		
							31.7	+3.3										77	2.79	+.1										7.6				
Buffalo [1]	768	34	96	988.5	1,017.6	−.4	31.5	+2.7	60	12	40	7	30	24	42	1,037	24	76	2.79	−.6	.74	18	17.2	w.	50	s.	29	4	6	21	7.9	11.9	.5	0
Canton	448	10	61	999.3	1,015.9	----	24.0	+2.2	56	13	33	−20	26	15	471	1,272	19	84	4.26	+1.6	.92	23	10.8	w.	39	w.	17	7	5	19	7.1	25.7	15.7	0
Oswego	335	71	85	1,005.4	1,018.3	+.3	30.8	+2.7	62	9	38	2	29	24	38	1,060	22	72	4.11	+.6	.71	20	13.3	se.	30	nw.	26	2	4	25	8.4	32.4	8.4	0
Rochester [1]	523	5	69	997.6	1,017.6	−.4	30.6	+2.8	62	9	38	6	30	23	35	1,069	24	80	2.61	−.1	.68	13	13.7	w.	47	sw.	29	3	9	19	7.6	13.6	3.0	0
Syracuse [1]	596	5	57	994.9	1,018.0	−.3	30.6	+3.2	64	9	40	0	31	22	39	1,067	24	75	3.14	+.1	.90	19	13.3	sw.	40	s.	12	5	2	24	7.9	25.8	4.9	0
Erie [2]	714	57	81	991.9	1,018.6	+.3	35.8	+3.9	63	12	43	16	2	28	36	906	28	80	3.16	+.3	.81	15	11.5	sw.	29	w.	29	2	4	25	8.3	14.3	1.5	0
Cleveland [1]	762	27	54	991.2	1,020.0	+1.0	34.0	+4.9	61	8	42	13	30	26	41	930	26	76	1.85	−.6	.63	16	13.6	w.	43	w.	12	3	7	21	7.7	8.8	2.0	0
Sandusky	629	5	67	995.6	1,019.3	+.3	34.5	+3.3	62	7	42	12	19	26	36	947	----	----	2.58	+.3	1.01	12	11.1	sw.	35	sw.	12	5	7	19	7.1	7.6	T	1
Toledo [1]	628	5	47	995.3	1,019.3	+.7	32.0	+2.9	60	8	41	6	2	23	35	1,021	24	74	1.98	−.4	.88	10	12.8	sw.	40	sw.	12	3	7	21	7.5	6.3	.2	0
Fort Wayne [1]	857	5	33	987.1	1,019.6	----	32.7	+4.1	65	8	41	10	2	24	34	1,001	26	82	2.14	−.4	1.09	12	10.1	w.	34	s.	27	6	6	19	7.0	3.1	.0	0
Detroit [1]	730	5	78	991.2	1,018.6	+.3	32.2	+3.3	60	8	40	5	30	25	35	1,019	24	74	2.10	−.2	1.39	11	12.2	sw.	35	nw.	13	5	8	18	7.0	5.3	.4	0
UPPER LAKES																																		
							24.9	+1.5										81	2.19	+.2										7.4				
Alpena	609	5	89	993.2	1,016.3	−.3	25.6	+.8	59	9	32	1	31	19	26	1,223	21	82	3.72	+1.6	2.51	10	12.2	sw.	40	se.	16	3	6	22	8.1	27.9	19.0	0
Escanaba	612	51	72	993.2	1,016.6	−.3	22.5	+.1	52	9	30	−10	31	16	32	1,321	17	78	1.19	−.6	.62	7	11.0	w.	32	n.	29	6	11	14	6.5	15.8	15.1	0
Grand Rapids [2]	707	70	244	991.2	1,018.0	+.4	31.9	+3.4	62	7	39	5	31	25	42	1,025	24	81	2.36	−.2	1.04	16	12.4	s.	39	sw.	17	0	13	18	7.5	15.4	4.0	0
Lansing [2]	878	5	90	985.1	1,018.0	----	30.2	+3.0	60	7	38	−1	31	22	37	1,080	22	78	3.06	+1.0	1.70	12	10.1	w.	28	w.	17	3	8	20	7.5	11.2	4.8	0
Marquette	734	44	73	987.5	1,015.9	−.7	22.4	−.2	55	9	29	−5	31	16	32	1,324	16	75	1.82	−.8	.81	10	9.9	w.	38	w.	17	3	7	21	7.8	21.6	15.9	0
Sault Sainte Marie [1]	614	11	52	991.9	1,015.2	−.7	19.8	+1.0	51	9	26	−20	30	13	31	1,398	17	86	2.90	+.7	.50	18	13.3	w.	37	sw.	17	1	1	29	9.0	27.1	19.2	0
Chicago [1]	673	5	35	993.6	1,019.0	+.4	31.9	+5.0	64	8	40	1	31	24	33	1,028	25	78	2.43	+.4	1.43	8	10.9	s.	34	nw.	12	3	12	16	7.2	8.3	3.5	0
Green Bay	617	5	32	994.6	1,018.3	+1.0	22.7	+.4	60	8	32	−15	31	14	35	1,312	17	78	1.75	.0	1.20	6	9.1	s.	34	sw.	16	4	9	18	7.1	6.4	4.8	0
Milwaukee [1]	681	33	66	992.2	1,018.0	.0	27.9	+3.2	63	8	37	−5	31	19	37	1,153	22	78	1.54	−.2	.79	7	13.6	w.	40	w.	16	5	13	13	6.7	6.8	4.1	1
Duluth [2]	1,133	5	47	973.6	1,016.9	−.7	14.0	−1.9	45	11	21	−31	31	6	30	1,588	10	92	1.14	.0	.47	8	12.3	w.	61	nw.	16	11	2	18	6.1	10.0	8.9	0
NORTH DAKOTA																																		
							12.9	+2.0										84	.51	−.1										7.8				
Fargo [1]	940	6	47	981.7	1,018.3	−.3	12.2	+.7	38	11	20	−23	31	4	33	1,633	10	88	.66	−.1	.41	6	13.0	s.	41	n.	16	6	4	21	7.5	7.1	6.0	0
Bismarck [1]	1,677	5	43	954.6	1,018.0	−.6	10.4	+3.6	51	6	26	−27	29	7	35	1,505	12	84	.53	.0	.26	12	10.5	nw.	36	nw.	16	3	7	21	7.7	8.2	4.6	0
Devils Lake	1,478	11	44	961.4	1,018.3	+.3	11.1	+1.6	42	11	20	−24	29	3	37	1,672	4	73	.21	−.3	.12	7	9.5	nw.	34	nw.	22	4	6	21	7.5	3.5	2.0	0
Grand Forks [1]	832	4	41	986.1	1,018.6	----	9.0	----	39	11	18	−24	30	0	34	1,737	7	90	.54	----	.30	11	----	s.	----	----	----	6	4	21	----	5.2	4.0	0
Williston	1,878	42	50	946.8	1,016.9	−1.1	15.8	+2.0	43	11	25	−25	29	6	40	1,522	12	85	.59	.0	.27	8	7.1	sw.	25	nw.	11	0	7	24	8.3	4.9	5.0	0
UPPER MISSISSIPPI																																		
Minneapolis-St. Paul [1]	919	43	74	982.7	1,018.0	−.6	31.5	+5.0	52	11	28	−22	31	13	32	1,376	14	76	1.60	−.1										6.7				
La Crosse [1]	714	5	29	990.9	1,018.3	−.3	20.6	+1.0	55	8	32	−24	31	15	35	1,293	17	78	.68	−.3	.30	8	11.2	nw.	45	w.	16	6	8	17	6.8	5.9	4.0	0
Madison [2]	974	70	78	981.4	1,018.6	.0	23.3	+2.9	55	8	32	−24	31	15	32	1,181	20	80	1.10	−.2	.71	5	9.4	s.	39	w.	16	7	8	16	6.6	5.0	4.0	0
Charles City	1,015	10	51	981.0	1,019.6	+.3	27.0	+4.2	60	8	35	−10	31	19	32	1,181	20	78	1.61	.0	.87	8	9.1	w.	25	w.	17	5	9	17	7.0	7.1	3.9	1
Moline [1]	606	6	50	996.3	1,020.0	+.7	26.0	+5.6	63	8	35	−16	31	17	34	1,297	----	----	.66	−.6	.31	6	7.2	nw.	21	s.	11	10	8	13	5.7	4.5	3.0	0
Des Moines [2]	860	5	99	-------	1,019.6	.0	31.4	+5.7	66	8	41	−8	31	22	40	1,043	24	73	1.43	.0	1.07	7	10.5	s.	35	w.	27	6	9	16	6.8	5.3	3.5	0
Dubuque	699	60	79	992.2	1,018.6	−.7	31.6	+5.6	69	8	42	−8	31	21	40	1,050	23	71	.20	−1.0	0.10	8	10.0	se.	32	w.	16	9	9	13	6.6	3.2	----	0
Burlington	702	4	36	992.9	1,019.3	−.7	30.4	+5.7	63	8	39	−10	31	22	37	1,078	22	74	1.22	−.2	.89	7	6.2	nw.	21	nw.	16	5	12	14	6.5	3.2	2.0	1
Cairo	357	5	99	1,007.8	1,021.3	+.3	32.4	+5.1	66	8	42	−5	31	23	34	1,016	26	81	2.47	+.8	1.75	10	10.6	s.	38	w.	27	5	7	19	7.1	3.9	2.4	0
Peoria [1]	609	6	26	997.0	1,020.0	+.4	44.6	+6.8	68	7	53	19	29	36	28	636	----	----	3.54	+.1	1.41	8	10.0	s.	31	sw.	12	8	6	17	6.6	1.6	1.6	1
Springfield, Ill. [2]	636	5	191	995.9	1,020.0	.0	33.0	+5.9	66	8	42	−3	31	24	35	988	26	78	1.76	.0	1.20	8	10.1	s.	36	w.	27	5	8	18	7.1	5.1	1.2	0
St. Louis [2]	568	35	303	999.3	1,020.3	.0	36.9	+5.2	67	8	45	6	31	29	31	873	28	80	1.55	−.6	.67	7	12.5	s.	30	n.	16	7	5	19	7.2	.7	T	0
	784	6	66	990.5	1,020.0	.0	41.0	+6.1	69	7	49	12	30	33	30	746	----	70	2.95	+.7	1.41	9	12.5	sw.	35	sw.	17	10	8	13	----	3.0	T	0
MISSOURI VALLEY																																		
							33.0	+5.2										74	1.00	−.1										6.3				
Columbia, Mo. [2]	967	11	49	983.4	1,019.3	----	39.0	+5.0	71	27	48	4	30	29	34	807	28	68	1.42	−.4	.77	7	7.5	s.	25	s.	27	7	6	18	7.1	.4	.2	0
St. Joseph [2]	1,324	5	67	973.2	1,019.6	−.7	36.5	+6.9	70	27	46	−2	30	28	38	881	27	74	1.46	+.2	1.28	6	8.2	s.	31	w.	27	8	7	16	6.5	1.5	.5	0
Springfield, Mo. [1]	987	65	87	982.7	1,019.3	----	41.0	+4.5	72	6	51	4	30	31	36	742	34	78	3.02	+.7	1.73	6	12.4	s.	38	sw.	27	3	10	18	----	T	----	1
Topeka [2]	1,189	11	81	974.6	1,019.3	−.7	38.4	+6.4	71	5	48	−1	30	28	37	828	28	72	1.57	+.6	1.56	3	9.2	s.	32	sw.	27	7	9	15	6.4	.3	T	0
Lincoln [2]	1,105	5	68	977.7	1,019.3	−.3	32.9	+5.3	63	6	43	−6	31	23	41	992	22	74	.17	−.6	.13	3	9.1	s.	35	nw.	16	10	9	12	5.7	1.7	.7	0
Omaha [1]	1,105	5	68	977.7	1,019.3	−.3	31.6	+5.2	68	8	42	−10	31	21	40	1,029	22	72	.12	−.8	.12	1	11.1	s.	40	nw.	16	10	6	15	6.0	2.3	2.0	0
Valentine	2,598	46	54	923.1	1,018.3	−1.0	28.8	+4.2	67	6	41	−16	29	17	45	1,118	18	72	.25	−.4	.13	5	9.1	w.	31	nw.	16	8	10	13	6.0	1.9	1.0	0
Sioux City [1]	1,138	5	40	976.0	1,019.0	−1.0	26.6	+5.0	61	9	38	−18	31	15	37	1,187	19	76	.56	−.3	.40	6	9.7	nw.	34	nw.	16	8	11	12	5.9	5.5	4.3	0
Huron [1]	1,301	5	41	969.2	1,018.6	−.7	22.7	+4.0	56	6	32	−16	29	13	30	1,312	18	84	.44	−.1	.34	5	12.3	nw.	43	nw.	16	4	15	12	6.6	3.3	2.4	0
NORTHERN SLOPE																																		
							27.4	+4.0										75	.75	+.1										7.0				
Billings [1]	3,570	16	40	889.3	1,016.6	----	29.4	+3.2	58	4	39	−6	28	20	41	1,107	20	72	.93	----	.49	8	11.4	sw.	39	nw.	15	4	10	17	7.2	15.2	2.5	0
Havre	2,507	11	67	924.5	1,017.3	−.3	19.8	−.6	49	10	30	−23	28	9	42	1,400	15	82	.56	.0	.26	8	10.1	sw.	33	sw.	10	4	10	17	7.2	7.9	3.7	0
Helena [1]	4,124	5	43	872.0	1,019.0	−1.3	26.2	+3.5	50	15	36	−18	28	17	35	1,204	19	78	.94	+.5	.33	9	7.2	w.	45	nw.	15	3	7	21	7.5	12.5	2.4	0
Missoula [1]	3,263	4	32	902.1	1,020.3	----	26.8	+5.4	47	4	34	−4	17	20	23	1,187	24	88	1.43	+.5	.47	11	4.7	nw.	26	nw.	15	2	4	25	8.0	11.9	1.1	0
Kalispell	2,973	48	56	911.6	1,018.6	+.3	24.0	−.9	46	10	31	−11	28	17	27	1,276	22	89	1.82	+.4	.73	14	4.8	w.	28	n.	27	3	4	24	8.2	22.1	6.7	0
Miles City [1]	2,371	5	78	930.6	1,018.3	−1.0	22.0	----	53	2	32	−22	29	12	32	1,332	18	82	.52	----	.24	8	----	s.	----	----	----	6	3	22	7.2	6.0	5.0	0
Rapid City [1]	3,259	5	63	899.8	1,017.3	−1.7	28.4	+3.3	64	11	41	−17	29	16	44	1,133	19	76	.21	−.2	.10	6	13.	4nw.	57	nw.	19	2	11	18	7.4	2.9	.6	0
Cheyenne [1]	6,094	5	40	811.0	1,017.3	−1.7	34.5	+6.0	59	5	45	−5	28	24	37	944	18	52	.19	−.4	.17	4	14.4	nw.	42	w.	11	5	15	11	6.5	2.1	.5	0
Lander [1]	5,352	60	68	833.1	1,017.6	−3.4	30.2	+9.8	56	14	42	−14	29	18	35	1,082	16	60	.12	−.6	.10	2	6.3	se.	43	w.	15	8	15	8	5.3	1.7	1.6	0
Sheridan [1]	3,790	5	38	882.2	1,017.3	----	27.6	+4.8	60	2	40	−20	29	15	41	1,158	18	75	1.32	+.7	.54	9	7.3	nw.	47	w.	15	4	6	21	7.2	13.4	3.6	0
North Platte [2]	2,821	11	51	916.4	1,018.6	−.7	32.6	+5.9	67	6	46	−9	29	20	40	1,004	21	74	.18	−.4	.15	2	6.4	w.	24	n.	16	8	11	12	5.9	1.6	.8	0

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS FOR DECEMBER 1946—Continued

District and station	Elevation of instruments: Barometer above sea level	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station	Pressure: Sea level	Pressure: Departure from normal	Temperature of the air: Mean	Temperature of the air: Departure from normal	Temperature of the air: Maximum	Temperature of the air: Date	Temperature of the air: Mean maximum	Temperature of the air: Minimum	Temperature of the air: Date	Temperature of the air: Mean minimum	Temperature of the air: Greatest daily range	Total degree days	Mean temperature of the dew point	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Greatest in 24 hours	Precipitation: Days with 0.01 inch or more	Wind: Average hourly velocity	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Average cloudiness, tenths: Clear days	Average cloudiness, tenths: Partly cloudy days	Average cloudiness, tenths: Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month	Number of days with thunderstorms
MIDDLE SLOPE	*Ft.*	*Ft.*	*Ft.*	*Mb.*	*Mb.*	*Mb.*	° *F.*	° *F.*	°*F*		°*F*	° *F.*		° *F.*	°*F.*		° *F.*	%	*In.*	*In.*	*In.*		*Mi.*								*0–10*	*In.*	*In.*	
							40.1	+6.7										68	.74	−.2											5.9			
Denver [2]	5,292	106	113	836.1	1,015.9	−2.7	39.6	+7.3	67	15	51	1	29	28	38	790	18	52	.09	−.6	.04	3	7.4	s.	23	nw.	19	9	16	6	5.3	2.7	T	0
Pueblo [1]	4,690	5	36	856.1	1,018.3	−.3	36.6	+6.5	71	4	53	−8	29	20	45	885	22	66	.09	−.4	.07	2	7.7	w.	37	w.	27	10	7	14	5.6	1.4	.4	0
Concordia	1,392	50	58	967.8	1,019.3	−.3	35.3	+4.6	64	5	46	−5	30	25	35	921	27	74	.04	−.6	.03	2	7.4	s.	28	n.	20	13	7	11	5.4	.4	.2	0
Dodge City [1]	2,509	5	58	928.2	1,018.0	−1.3	38.6	+6.0	69	15	51	1	29	26	38	821	26	71	.03	−.5	.02	2	14.3	sw.	45	n.	16	11	10	10	5.6	.3	T	0
Wichita [1]	1,358	6	64	968.8	1,018.6	−1.0	40.0	+5.4	69	5	50	3	30	30	33	776	30	70	.78	−.2	.72	4	14.4	s.	42	s.	27	6	12	13	6.6	T	.0	1
Oklahoma City [2]	1,214	10	47	975.3	1,019.3	−.3	45.6	+6.3	75	27	54	8	30	37	39	604	34	72	1.71	+.2	1.10	6	9.7	s.	26	sw.	27	8	10	13	6.0	.5	.5	0
Tulsa [1]	674	10	60	994.6	1,019.3	-----	45.2	+6.4	77	27	55	8	30	36	36	615	36	74	2.46	+.6	1.11	6	11.9	sw.	40	sw.	27	6	10	15	6.7	T	.0	3
SOUTHERN SLOPE																															5.3			
							48.4	+5.0										64	1.25	+.4											5.6	4.8	4.0	0
Abilene [1]	1,738	4	59	956.7	1,018.6	−1.0	50.2	+5.1	77	5	61	16	31	39	44	458	37	68	2.38	+1.0	2.30	4	14.2	s.	41	s.	7	8	10	13	5.6	4.8	4.0	0
Amarillo [1]	3,676	5	42	889.9	1,017.8	−1.2	43.2	+7.7	75	6	56	7	29	30	48	678	28	66	1.18	+.4	1.12	2	13.6	sw.	42	w.	27	11	11	9	5.3	.9	T	0
Del Rio	960	63	71	984.4	1,018.6	−.7	55.7	+3.5	86	28	66	25	31	45	37	299	43	68	.66	.0	.30	6	7.7	se.	26	n.	1	13	7	11	5.0	T	T	0
Roswell	3,566	75	85	894.7	1,018.3	.0	44.7	+3.5	76	15	59	15	29	30	41	632	26	53	.78	+.1	.75	4	6.3	s.	28	w.	28	13	4	14	5.3	.1	.1	0
SOUTHERN PLATEAU																															5.3			
							48.9	+4.6										50	.73	−.2									1			4.8	.8	.5	1
El Paso [1]	3,778	29	85	887.9	1,017.6	+.7	47.0	+3.3	72	4	59	17	31	35	38	555	28	51	1.31	+.8	1.05	5	9.0	ne.	42	nw.	28	5	5	11	4.8	.8	.5	1
Albuquerque [1]	5,314	5	45	838.8	1,017.6	-----	40.4	+5.9	66	14	53	12	31	28	36	763	22	48	.12	−.3	.10	2	8.2	se.	39	se.	30	13	7	11	5.1	T	.0	0
Flagstaff	6,907	36	51	790.4	1,019.6	+1.6	36.0	+6.4	66	14	51	−7	29	21	44	901	20	58	1.15	−.8	.57	5	----	n.	--	-------	--	11	6	14	5.8	6.3	1.3	0
Phoenix [2]	1,107	39	87	976.0	1,015.9	−1.4	55.8	+3.8	80	4	69	32	29	42	38	289	36	56	.45	−.6	.36	2	5.5	e.	21	nw.	28	11	10	10	5.5	.0	.0	1
Tucson [1]	2,555	5	39	926.5	1,015.6	-----	55.6	+4.9	82	4	69	30	30	42	40	304	32	46	.46	−.5	.44	2	----	se.	--	-------	--	9	10	12	5.7	.0	.0	0
Yuma	142	9	54	1,010.5	1,015.6	−2.0	58.5	+3.3	80	1	70	37	9	47	32	206	34	44	.88	+.4	.88	2	5.9	n.	32	n.	30	14	8	9	4.7	.0	.0	1
MIDDLE PLATEAU																															6.9			
							34.4	+4.9										73	1.03	0.0											7.2	1.0	.0	0
Reno [1]	4,527	20	52	864.2	1,020.7	−.3	35.2	+3.3	65	14	49	9	18	21	42	923	24	70	.39	−.6	.28	4	5.4	s.	40	s.	3	5	5	21	7.6	2.0	.6	1
Winnemucca	4,339	5	56	870.3	1,021.0	−1.0	34.5	+4.5	62	14	46	3	31	24	35	943	25	68	1.00	−.1	.38	7	7.5	sw.	29	sw.	15	5	5	21	7.6	10.1	2.3	1
Modena	5,473	10	58	834.7	1,019.6	−.4	33.8	+5.7	63	14	45	2	31	22	36	970	----	--	1.07	+.2	.53	3	7.6	sw.	24	sw.	5	10	11	10	5.6	T	.0	0
Salt Lake City [1]	4,227	32	46	869.3	1,020.7	−.3	35.8	+5.6	61	14	44	4	31	28	26	905	28	77	1.91	+.5	.74	6	8.0	se.	34	s.	4	3	7	21	7.6	10.1	2.3	1
Grand Junction	4,602	60	68	862.9	1,023.7	+4.4	32.7	+5.2	52	6	43	3	29	22	28	1,003	24	76	.80	+.2	.53	5	4.1	se.	25	nw.	28	7	7	17	6.4	4.1	2.4	0
NORTHERN PLATEAU																															7.6			
							34.6	+5.0										81	.75	−.9											7.2	2.4	2.0	0
Baker [2]	3,471	36	54	897.1	1,020.7	−.6	32.8	+5.5	52	14	41	−1	30	25	27	998	26	82	.74	−1.0	.35	8	5.5	se.	23	sw.	10	5	6	20	7.2	T	.0	0
Boise [1]	2,739	5	49	923.1	1,021.0	−1.7	36.2	+5.9	57	3	44	14	30	28	24	893	30	78	.86	−.7	.25	9	8.2	se.	27	nw.	27	4	7	20	7.4	T	.0	0
Pocatello [1]	4,478	5	31	864.5	1,021.3	−1.1	32.9	+7.6	57	4	41	0	31	25	31	995	26	77	.78	−.4	.28	10	9.9	sw.	34	sw.	12	3	2	26	8.1	4.3	1.0	0
Spokane [1]	1,929	27	42	948.5	1,019.0	+.4	32.6	+2.1	55	4	39	1	29	26	21	1,000	28	82	.90	−1.3	.35	10	6.1	sw.	26	w.	11	2	7	22	8.0	5.0	3.0	0
Walla Walla	991	57	65	983.4	1,020.0	.0	39.3	+3.8	61	4	45	18	28	33	29	801	----	--	1.09	−1.0	.63	12	5.1	s.	25	w.	11	4	6	21	7.6	.7	T	0
Yakima [1]	1,076	58	67	979.0	1,019.0	-----	33.9	-----	64	10	43	8	30	25	31	965	28	84	.11	-----	.04	4	----	w.	--	-------	--	6	6	19	7.2	T	.0	0
NORTH PACIFIC COAST																															8.1			
							41.9	+.2										84	5.97	−1.2											7.7	.0	.0	0
North Head	211	5	55	1,010.5	1,018.3	+1.4	43.6	−.5	55	2	48	30	17	40	14	662	40	86	6.87	−2.6	1.23	20	15.2	s.	50	s.	1	4	5	22	8.1	.4	.0	0
Seattle [2]	125	90	321	1,013.9	1,018.6	+2.3	41.8	−.8	58	2	46	27	30	38	13	719	36	85	5.79	+.2	1.39	18	10.2	se.	37	s.	10	3	4	24	8.1	.4	.0	0
Tacoma	194	172	201	1,011.5	1,018.6	+2.3	41.0	+.4	57	2	45	24	30	36	15	747	----	--	6.41	−.3	1.32	21	8.5	s.	31	s.	1	4	6	21	7.7	T	.0	0
Tatoosh Island	86	9	61	1,013.9	1,017.3	+2.7	41.9	−2.0	53	2	45	33	15	39	11	716	38	84	12.66	−.7	2.27	21	18.2	e.	51	s.	2	4	1	26	8.2	T	.0	1
Medford [1]	1,329	29	58	972.6	1,021.7	-----	38.8	+.7	59	4	46	22	18	32	22	814	35	86	1.28	−1.6	.64	8	----	n.	--	-------	--	2	6	23	8.2	T	.0	0
Portland, Oreg. [2]	154	68	106	1,013.9	1,020.0	+1.7	43.8	+2.6	59	3	48	27	30	40	13	656	37	82	6.01	−.7	2.01	16	6.0	s.	24	sw.	12	3	5	23	8.4	.0	.0	0
Roseburg	510	45	76	1,002.0	1,021.0	+1.4	42.6	+.8	59	4	48	28	18	38	19	697	38	84	2.76	−2.6	1.04	15	3.4	s.	15	sw.	14	0	3	28	8.7	.0	.0	0
MIDDLE PACIFIC COAST																															7.3			
							48.2	+.2										80	2.26	−2.2											7.1	.0	.0	0
Eureka	60	72	88	1,018.0	1,020.3	+.3	48.7	+.5	64	2	55	32	30	42	21	507	44	81	1.56	−4.7	.32	16	6.0	se.	27	n.	26	6	5	20	7.6	.0	.0	0
Red Bluff [1]	353	5	26	1,006.8	1,019.6	-----	46.6	+.5	67	22	54	28	31	40	28	568	38	74	3.14	−1.3	1.61	11	6.4	nw.	24	nw.	27	5	4	22	7.6	.0	.0	0
Sacramento [3]	66	92	115	1,017.3	1,019.6	−1.1	46.0	−.2	61	22	52	31	18	41	21	587	42	86	1.56	−1.5	.48	8	5.2	n.	22	n.	30	3	7	21	7.7	.0	.0	0
San Francisco [3]	155	112	132	1,013.2	1,019.0	−1.0	51.4	+.1	64	23	56	41	20	47	14	424	42	80	2.77	−1.2	1.26	10	5.9	n.	18	w.	6	6	7	18	6.7	.0	.0	0
SOUTH PACIFIC COAST																															7.0			
							53.0	+.6										76	2.20	+.3											8.6	.0	.0	0
Fresno [1]	327	5	34	1,007.1	1,019.6	−.7	45.6	+.5	66	23	52	27	31	39	26	602	42	87	1.95	+.5	.82	8	3.5	se.	19	nw.	27	1	5	25	8.6	.0	.0	0
Los Angeles	338	223	250	1,005.1	1,017.3	−1.0	56.4	−.2	72	10	64	41	15	49	26	266	44	66	3.47	+.8	2.13	6	6.3	w.	29	n.	30	9	9	13	5.9	.0	.0	1
San Diego [1]	87	20	55	1,013.5	1,016.6	−1.7	57.1	+1.6	75	20	65	42	9	49	30	246	47	74	1.18	−.7	.54	4	5.4	ne.	22	e.	25	5	12	14	6.5	.0	.0	0
ALASKA																																		
Anchorage [1]	132	6	44	1,005.1	1,010.2	-----	5.0	−8.3	42	18	12	−33	15	−3	29	1,856	−1	68	0.97	+0.11	0.30	10	6.9	ne.	45	sw.	18	11	4	16	6.1	16.7	15.3	0
Fairbanks [1]	455	5	63	999.7	1,018.6	-----	-22.6	−15.5	19	31	−15	−57	14	−30	52	2,715	−26	84	.53	− .06	.11	14	2.4	nw.	17	sw.	19	4	9	18	7.2	9.2	18.6	0
Juneau [1]	80	6	30	1,007.1	1,010.2	-----	21.7	−4.2	43	18	27	−7	11	17	22	1,343	17	77	2.47	−3.15	.64	20	8.5	n.	40	se.	17	2	3	26	8.6	21.9	T	0
Nome	22	10	75	1,015.6	1,016.3	-----	−1.1	−8.6	28	31	8	−36	18	−10	39	2,046	−1	92	1.76	+ .65	1.02	11	12.9	e.	47	e.	21	8	7	16	6.4	16.8	41.8	0
Bethel	28	5	31	1,013.5	1,014.9	-----	0.6	−6.4	36	22	9	−35	13	−8	39	1,991	−2	86	1.27	+ .49	.39	14	11.2	n.	29	-------	4	7	8	16	6.4	12.7	16.1	0
Cordova	45	5	32	1,003.7	1,005.8	-----	14.8	-----	38	18	24	−15	12	6	37	1,555	14	89	5.95	-----	1.83	16	----	e.	--	-------	--	1	5	25	9.0	6.0	2.1	0
Gambell	32	5	32	1,016.3	1,017.3	-----	7.1	−1.8	31	30	12	−13	16	2	27	1,795	6	---	.38	− .27	----	11	----	n.	--	-------	--	5	3	1	27	8.5	31.7	0.0	0
Ketchikan	32	5	32	1,016.3	1,017.3	-----	34.2	−1.1	44	18	38	22	27	30	14	958	32	88	16.20	+ .26	2.58	23	6.4	se.	29	se.	5	3	1	27	8.5	31.7	0.0	0
Kotzebue	25	69	90	1,009.1	1,010.2	-----	10.6	−6.5	27	31	−3	−36	16	−18	31	2,325	−20	63	.42	+ .13	.12	13	----	ne.	--	-------	--	6	12	13	6.2	4.1	0.6	0
McGrath	20	5	31	1,017.3	1,018.0	-----	-17.2	−9.3	25	24	−8	−61	15	−26	42	2,538	−18	90	1.63	+ .40	.45	14	----	nw.	--	-------	--	11	4	16	6.1	31.7	30.5	0
HAWAII																																		
Honolulu	38	86	100	1,011.2	1,012.5	-----	72.2	−.2	82	11	77	64	30	68	13	0	----	---	5.25	+1.3	1.27	18	9.0	ne.	38	ne.	20	7	11	13	6.3	.0	.0	3

[1] Data are airport records.
[2] Barometric data (adjusted to old city elevation) and hygrometric data from airport; otherwise city office records.
[3] Observations taken bihourly.
[4] Pressure (adjusted to old city elevation), temperature, and hygrometric data from airport; otherwise city office records.
[5] Temperature and precipitation from city records, other data from airport.

NOTE.—Except as indicated by notes [1], [2], [4], and [5] data in table are city office records.

SEVERE LOCAL STORMS FOR DECEMBER 1946

[The table herewith contains such data as have been received concerning severe local storms that occurred during the month. A revised list will appear in the United States Meteorological Yearbook]

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
	Dec. 1946						
Massachusetts Bay, off Brant Rock, Mass. About 4 miles offshore.	2	3 p. m.		2		Northwest gale	Through the sinking of the barge *Winsor*, stern barge in a tow of 3 barges bound from New York to Boston, 2 persons drowned and 1,800 tons of anthracite coal were lost. Maximum wind velocities of 29 to 33 miles per hour and temperatures from 15 to 18 degrees were recorded.
Philadelphia, Pa.	2			1		Wind	Man died of a heart attack induced by extreme cold; 5 others were injured when wind blew over a 55-foot section of steel smokestack. Wind up to 50 miles per hour grounded 5 ships, snapped electric line poles, and blew down a 40-foot electric sign. Estimated loss in thousands of dollars.
Erie, Pa.	12 and 13					do	Winds of 40 miles per hour with higher gusts severed electric and telephone wires and injured 2 persons. Considerable damage to highway on the peninsula, which was covered by water.
New Tripoli, Pa.	20					Rain and sleet	Telephone wires down.
Michigan	27–29					Snow, rain, and sleet.	The cold wave, which rapidly displaced warm air moving northward through the State, hit the Upper Peninsula and the northern portion of the Lower Peninsula on the 27th. New snow added to that already on the ground piled up to 17 inches at Sault Ste. Marie, the night of the 27th. Alpena reported 15 inches; Houghton, 10 inches, and Pellston and Marquette, 9 inches. Heavy snows were general from Bay City north to Lake Superior on the far tip of the Upper Peninsula. At Sault Ste. Marie the 28th was clear and cold after a night of gale-driven snow made city streets impassable. Snow plows were used to free marooned automobiles. An ice storm developed over a wide area in northwestern Michigan from Clare west to Ludington, and from Howard City to Kalkaska, coating highway with nearly an inch of solid ice, bringing transportation to a standstill. North of Kalkaska and through the northeastern section of the Lower Peninsula, over 6 inches of snow fell, blown by high winds into huge drifts. Heavy snow fell in the extreme northern portion of lower Michigan, with rain and sleet in the central portion and occasional rain in the extreme south. At Reed City and Traverse City, 5 buses with their passengers were halted because of icy highways; accommodations were provided for them in hotels and private homes until traffic conditions improved. Warm rains were experienced over Lansing; this area escaped the heavy snow which blanketed northern areas of the State.
Indiana, northeastern portion of State.	28–29					Glaze	Some wires down; tree branches broken.
Christian and Todd Counties, Ky.	29	12:15–1:30 a. m.	100–800	0	$300,000	Tornado	Most damage occurred at Camp Campbell, where a number of buildings and much stored military equipment were destroyed. Several stock and tobacco barns blown over. Several persons injured, 2 seriously, by flying debris.
Louisiana, northern portion.	Dec. 30–Jan. 1		100	0	3,000,000	Ice and sleet	Heavy ice and sleet extended over a strip approximately 100 miles wide across Louisiana into west-central Mississippi. Damage mostly confined to timber, fruit, pecan, and ornamental trees and shrubs; some livestock was lost in Morehouse Parish, and 30 percent of tin roofs in Bienville Parish damaged. Tops blown out of pine trees, while pecan limbs broke under the ice. Loss in forests, mostly to pine trees, $2,000,000; in fruit and pecan trees, $400,000; to power and communication lines, $500,000; to buildings, $100,000.
Mississippi, west-central portion.	Dec. 30–Jan. 1	P. m. of 30th–entire day of Jan. 1.	100	1	1,000,000	do	Damage mostly confined to timber, fruit, pecan, and ornamental trees and shrubs, power and communication lines, with some damage to buildings. Man badly injured as a result of severe weather. Estimate of damage to forests, $600,000; to fruit and pecan trees, $150,000; to power and communication lines, $200,000; to buildings, $50,000.

SOLAR RADIATION AND SUNSPOT DATA FOR DECEMBER 1946

[Solar Radiation Investigations Section, I. F. HAND in Charge]

SOLAR RADIATION OBSERVATIONS

Explanations of the tables and references to descriptions of instruments, stations, and methods of observation and to summaries of data, are given in the MONTHLY WEATHER REVIEW, vol. 72, page 43, January 1944. A list of pyrheliometric stations is given on page 45 of the same REVIEW.

Restandardization of pyrheliometric equipment at Davis, Calif., showed that readings made prior to July 2, 1946, were too high; therefore, these values should be multiplied by 0.918. All values since July 2, 1946, are correct.

Restandardization of pyrheliometric equipment at Tooele, Utah, showed that readings made prior to July 2, 1946, were too high; therefore, these values should be multiplied by 0.903. All values since July 2, 1946, are correct.

TABLE 1.—*Solar radiation intensities during December 1946*

[Gram calories per minute per square centimeter of normal surface]

Date	Sun's zenith distance: 7:30 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	1:30 p.m.
	75th mer. time	Air mass: A. M.				*1.0	P. M.				75th mer. time
	e.	5.0	4.0	3.0	2.0		2.0	3.0	4.0	5.0	e.
MADISON, WIS.											
	mb.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*
Dec. 2	1.4	0.81	0.94								2.7
Dec. 3	3.5		.62	0.84		1.27					4.0
Dec. 4	3.8	.58	.76	.99		1.28					6.1
Dec. 7	7.8	.49	.62	.77							9.4
Dec. 11	5.3		.87	1.07		1.41					4.4
Dec. 13	1.5	.96	1.03	1.25		1.65					1.2
Dec. 24	3.1	1.02	1.15	1.25							2.9
Dec. 31	0.5		.95	.99							.6
Means		.77	.87	1.02		1.40					
Departures		−.14	−.17	−.17		−.12					
LINCOLN, NEBR.											
Dec. 8	7.8	0.86	0.99	1.14				1.18	1.05	0.96	8.7
Dec. 9	4.8			1.03				1.09	1.03	.92	8.1
Dec. 10	3.8	.89	1.00	1.14				1.16	1.03	.94	5.1
Dec. 11	5.6	.83	.94	1.09				1.11	.96	.88	5.6
Dec. 16	8.7							1.03	.92	.85	4.6
Dec. 17	1.7		1.09	1.24				1.22	1.07	1.01	1.4
Dec. 18	1.7		.85	1.00				1.11	.96	.88	1.7
Dec. 21	4.8	1.01	1.09	1.20				1.24	1.14	1.05	4.4
Dec. 23	4.2	.92	1.01	1.14				1.18	1.05	.96	3.3
Means		.90	1.00	1.12				1.15	1.02	.94	
Departures		−.05	−.09	−.10				−.04	−.04	.00	
TABLE MOUNTAIN, CALIF.											
Dec. 7						1.54					
Dec. 9						1.50					
Dec. 14						1.55					
Dec. 16						1.57					
Dec. 29		1.24	1.34	1.44		1.56					
Dec. 31						1.55					
Means		(1.24)	(1.34)	(1.44)		1.54					

SOLAR RADIATION OBSERVATIONS—Continued

TABLE 1.—*Solar radiation intensities during December 1946*—Con.

[Gram calories per minute per square centimeter of normal surface]

Date	Sun's zenith distance: 7:30 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	1:30 p.m.
	75th mer. time	Air mass: A. M.				*1.0	P. M.				75th mer. time
	e.	5.0	4.0	3.0	2.0		2.0	3.0	4.0	5.0	e.
CLIMAX, COLO.											
Dec. 1				1.40	1.50						
Dec. 2			1.24	1.40	1.53			1.33	1.17	1.04	
Dec. 9							1.58	1.36	1.20	1.10	
Dec. 10				1.24	1.50						
Dec. 16			1.30	1.44	1.56			1.40	1.27	1.17	
Dec. 17				1.33	1.48						
Dec. 18		1.27	1.38	1.50	1.58			1.40	1.27	1.24	
Dec. 21		1.25	1.35	1.44					1.32	1.25	
Dec. 24			1.30	1.40	1.54						
Dec. 26		1.19	1.27	1.33	1.50			1.39			
Dec. 28		1.24	1.32	1.45	1.53						
Dec. 29			1.38	1.49	1.62			1.45	1.33	1.24	
Dec. 30		1.16	1.30	1.41							
Dec. 31		1.28	1.40	1.52	1.64			1.50	1.40	1.32	
Means		1.23	1.32	1.41	1.54		(1.58)	1.40	1.28	1.19	
BLUE HILL, MASS.											
Dec. 4	3.5	0.58	0.70	0.89							4.2
Dec. 7	6.5							0.88	0.72		6.5
Dec. 11	4.4		1.15	1.26				1.24	1.12	1.03	3.0
Dec. 13	15.0							1.24	1.06	.96	4.2
Dec. 14	1.8	.99	1.09	1.25							1.9
Dec. 16	2.1	.97	1.12	1.27				1.29	1.19	1.07	1.5
Dec. 22	3.6	.78	.89								3.0
Dec. 23	3.3	.86	.96	1.08							3.7
Dec. 25	2.5	.89	1.07							1.01	2.1
Dec. 26	3.3							1.28		1.05	1.8
Dec. 27	0.7	1.02									1.4
Dec. 30	3.6	.92	1.01	1.13				1.14	1.11	1.01	3.9
Means		.88	1.00	1.15				1.18	1.04	1.02	
Departures		−.01	−.03	−.02				+.03	+.01	+.05	
BOSTON, MASS.											
Dec. 4	3.1		0.72	0.81							3.8
Dec. 11	4.6		1.05	1.12				1.10	1.08	0.91	3.1
Dec. 13	15.3								.88	.80	3.8
Dec. 16	2.3	0.83	1.02	1.06							1.7
Dec. 19	2.6	.58	.64	.91							2.6
Dec. 23	3.8	.75	.80	.95							4.4
Means		.72	.85	.97				(1.10)	(.98)	(.86)	
Departures		+.01	+.01	−.01				+.25	+.13	+.12	
RATIO, BOSTON/BLUE HILL, ON COMPARABLE DATES											
		(.86)	.92	.88				(.89)	(.90)	(.86)	

*Extrapolated.

TABLE 2.—*Daily totals and weekly means of solar radiation (direct + diffuse) received on a horizontal surface*

[Gram calories per square centimeter]

Date	Washington, D. C.	Madison, Wis.	Lincoln, Nebr.	East Lansing, Mich.	New York, N. Y.	Fresno, Calif.	Columbia, Mo.	Boston, Mass.	Nashville, Tenn.	Twin Falls, Idaho	La Jolla, Calif.	Riverside, Calif.	Blue Hill, Mass.	Newport, R. I.	State College, Pa.	Put-in-Bay, Ohio	Salt Lake City, Utah	Davis, Calif.	Tooele, Utah	New Orleans, La.	Toronto, Canada	Ithaca, N. Y.	Boulder, Colo.	Soda Springs, Calif.
1946	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
Dec. 3	168	179	241	56	129	56	263	112	215	104	186	208	180	221	176	84	156	36	125	307	18	156	169	153
Dec. 4	253	185	227	159	134	64	247	116	229	82	148	174	170	186	184	166	80	31	74	321	78	77	165	34
Dec. 5	240	143	153	116	124	68	220	54	221	41	268	233	111	159	136	97	188	53	146	290	63	65	161	41
Dec. 6	161	106	166	101	148	54	218	2	209	140	118	162	36	67	114	158	172	47	151	279	14	151	220	49
Dec. 7	184	117	83	136	78	161	170	82	155	35	248	296	158	178	110	160	54	99	40	273	98	163	193	148
Dec. 8	187	80	162	70	88	261	87	90	237	84	----	277	134	138	137	104	240	168	204	204	63	108	248	170
Dec. 9	227	130	236	32	66	152	22	7	176	123	----	302	43	81	159	50	200	232	238	----	49	119	241	239
Means	203	136	181	96	110	117	175	66	206	87	193	236	119	147	145	117	156	95	140	279	55	120	200	119
Departures	+42	+19	+8	+6	−15	−63	+27	−34	+84	−35	−48	+13	−16	+9	+19	−3	----	−75	−63	+65	−29	+18	−1	----
Dec. 10	187	172	253	62	116	209	127	98	40	171	270	276	128	148	80	30	128	166	156	174	15	30	193	255
Dec. 11	117	192	230	154	190	209	38	177	46	141	274	289	199	206	215	150	91	106	208	149	154	205	98	209
Dec. 12	94	20	135	1	11	133	39	64	34	82	259	280	83	55	18	17	98	56	224	138	14	9	172	242
Dec. 13	250	212	122	174	192	27	105	157	218	53	153	258	172	156	211	217	180	23	237	261	131	155	217	193
Dec. 14	252	89	41	168	157	33	52	161	238	111	91	267	201	206	205	152	246	26	264	294	93	80	141	254
Dec. 15	109	49	55	148	53	49	53	131	55	36	138	290	151	95	89	64	89	60	137	291	115	123	192	115
Dec. 16	125	13	188	13	175	26	39	174	163	172	87	258	217	218	112	12	275	233	260	188	48	174	227	263
Means	162	107	146	103	128	98	65	137	113	110	182	274	164	155	133	92	158	97	213	214	81	111	177	219
Departures	+20	−11	−14	+3	+11	−67	−85	+25	−19	−16	−53	+65	+25	+8	+19	−18	----	−67	+3	+16	−17	−7	−21	----
Dec. 17	167	184	248	91	42	46	261	8	43	198	216	252	24	20	108	211	184	240	171	198	175	168	196	219
Dec. 18	155	169	218	74	62	40	259	23	245	142	209	268	53	24	176	195	277	236	246	270	115	138	268	256
Dec. 19	176	125	134	119	128	150	163	138	143	119	270	288	182	167	168	26	92	128	99	122	144	159	178	256
Dec. 20	33	119	76	82	14	103	181	34	19	163	222	215	62	55	19	----	254	51	242	68	29	76	224	197
Dec. 21	70	78	240	93	10	113	166	4	99	173	155	230	17	10	39	46	218	141	213	322	40	75	97	173
Dec. 22	184	89	220	60	133	70	267	139	225	86	127	119	147	149	108	52	55	141	81	311	159	121	225	152
Dec. 23	126	142	218	78	111	160	91	132	227	184	68	65	158	138	147	34	224	128	183	281	35	96	90	139
Means	130	129	194	85	71	98	198	68	143	152	181	205	92	80	109	94	186	148	176	212	100	119	182	199
Departures	−19	+7	+24	−12	−41	−47	+46	−40	−6	+38	−42	−7	−45	−56	−23	−28	----	+41	−16	−4	+3	+18	−8	----
Dec. 24	233	188	117	89	116	32	211	139	205	170	65	72	136	142	167	51	32	36	69	260	67	192	211	52
Dec. 25	246	93	189	74	217	52	235	116	256	107	45	50	151	137	136	90	147	59	92	280	88	176	227	138
Dec. 26	231	177	187	179	109	42	152	104	181	63	221	176	136	92	161	176	21	62	35	220	161	121	214	114
Dec. 27	92	14	80	38	79	183	101	130	142	57	153	92	183	152	74	27	95	249	72	192	31	147	214	137
Dec. 28	210	40	40	73	88	245	144	2	156	188	233	287	16	25	150	65	309	244	277	----	57	34	38	248
Dec. 29	29	76	239	62	8	237	149	11	32	144	275	302	33	19	10	17	261	58	271	29	8	51	260	195
Dec. 30	178	187	225	195	193	63	157	178	40	170	284	325	206	201	228	148	288	263	244	----	167	150	158	277
Dec. 31	46	191	219	113	72	190	125	100	25	79	288	323	126	133	75	121	234	244	251	----	117	143	294	230
Means (8-day)	158	121	162	103	110	130	159	98	129	122	195	203	123	112	125	87	174	152	164	196	87	127	202	174
Departures	+14	+6	+3	+21	−11	−11	+29	−5	+38	−7	−27	−1	−2	−19	+35	+7	----	+28	−11	+25	+3	+29	+12	----
ACCUMULATED DEPARTURES ON DECEMBER 31, 1946																								
	+5,677	+4,570	−2,741	+3,227	−10,504	+3,503	----	+226	+2,655	−5,985	----	+1,651	−2,480	−3,260	+6,454	----	----	+11,375	−2,111	----	----	----	+1,440	----
PERCENTAGE DEPARTURES FOR THE YEAR																								
	+4.6	+3.8	−2.1	+3.1	−9.3	+2.1	----	+0.2	+2.2	−4.3	----	+1.1	−2.0	−2.6	+5.6	----	----	+7.1	−1.3	----	----	----	+1.0	----

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR DECEMBER 1946

By LUCY T. DAY

[Equatorial Division, U. S. Naval Observatory]

[Communicated by the Superintendent, U. S. Naval Observatory.] All measurements and spot counts were made at the Naval Observatory from plates taken at the observatories indicated. Difference in longitude is measured from the central meridian, positive toward the west. Latitude is positive toward the north. Areas are corrected for foreshortening and expressed in millionths of Sun's hemisphere. For each day under Mount Wilson group number, longitude, latitude, area of spot or group, and spot count, are included respectively: number of groups, assumed longitude of center of the disk, assumed latitude of center of the disk, total area of spots and groups, and total spot count.

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1946	h m		°	°	°	°				
Dec. 1	12 44	8305	−77	231	−24	77	388	10	G	Mt. Wilson.
		8302	−64	244	+24	66	48	8		
		8302	−59	249	+24	61	24	6		
		8298	−32	276	−21	37	48	20		
		8298	−27	281	−19	33	121	9		
		8297	−23	285	+17	27	61	1		
		8304	−15	293	−18	24	12	3		
		8303	+3	311	+12	12	48	16		
		8295	+4	312	−17	19	97	1		
		8303	+5	313	+13	13	61	15		
		8299	+6	314	+17	16	12	3		
		(8)		(308)	(+1)		920	92		
2	10 59	8305	−69	228	−23	71	16	3	VG	Do.
		8305	−66	231	−24	69	388	10		
		8305	−63	234	−23	67	48	6		
		8302	−53	244	+24	57	12	4		
		8298	−22	275	−20	30	36	16		
		8298	−19	278	−18	27	24	10		
		8298	−15	282	−19	25	97	7		
		8297	−11	286	+18	20	61	1		
		8306	−6	291	+26	26	6	1		
		8304	−1	296	−17	18	12	2		
		8295	+15	312	−16	23	97	1		
		8303	+16	313	+13	20	242	36		
		8299	+17	314	+17	23	16	7		
		(9)		(297)	(+1)		1,055	104		
3	10 41	8307	−75	209	+37	78	97	1	P	U. S. Naval.
		8305	−54	230	−25	58	194	2		
		8305	−49	235	−24	53	218	4		
		8298	−1	283	−20	21	73	1		
		8297	+2	286	+18	16	48	1		
		8303	+27	311	+12	30	145	3		
		8295	+29	313	−17	33	61	1		
		8303	+33	317	+13	35	194	1		
		(6)		(284)	(+1)		1,030	14		
4	11 55	8312	−65	205	−8	66	12	1	F	Do.
		8307	−63	207	+37	69	121	8		
		8305	−41	229	−25	47	121	6		
		(*)	−37	233	−15	41	24	2		
		8305	−36	234	−24	42	194	12		
		8298	+12	282	−20	23	73	1		
		8297	+15	285	+19	24	48	1		
		8303	+39	309	+18	43	73	5		
		8303	+40	310	+12	41	73	7		
		8295	+42	312	−17	45	61	1		
		8303	+45	315	+13	47	194	1		
		(8)		(270)	(0)		994	45		
5	11 11	8312	−51	206	−9	52	24	1	F	Do.
		8307	−48	209	+36	57	61	1		
		8305	−28	229	−25	37	97	5		
		8311	−24	233	+31	39	36	2		
		8305	−22	235	−24	32	121	8		
		8310	+3	260	+31	31	24	4		
		8298	+26	283	−21	33	73	1		
		8297	+28	285	+19	34	48	1		
		8309	+42	299	−18	45	24	3		
		8308	+50	307	+18	52	121	4		
		8303	+51	308	+12	52	6	1		
		8295	+56	313	−17	58	48	1		
		8303	+59	316	+15	60	194	1		
		(11)		(257)	(0)		887	33		
6	11 24	8313	−80	164	−16	80	194	1	F	Do.
		8312	−39	205	−9	39	12	1		
		8307	−36	208	+36	49	48	2		
		8305	−16	228	−25	30	97	4		
		8305	−10	234	−24	26	121	6		
		8310	+18	262	+30	35	24	1		
		8298	+39	283	−21	43	73	1		
		8308	+64	308	+17	66	291	6		
		8303	+70	314	+14	71	194	1		
		(8)		(244)	(0)		1,054	23		

See footnotes at end of table.

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR DECEMBER 1946—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1946	h m		°	°	°	°				
Dec. 7	10 19	8314	−80	151	+9	80	97	1	G	U. S. Naval.
		8313	−69	162	−16	70	97	4		
		8307	−24	207	+36	43	48	3		
		8305	−4	227	−26	27	61	4		
		8305	−3	228	−25	25	73	10		
		8310	+31	262	+30	42	6	1		
		8298	+51	282	−21	53	73	1		
		8309	+73	304	−20	74	194	8		
		8308	+80	311	+17	80	170	5		
		8303	+86	317	+14	86	194	2		
		(0)		(231)	(0)		1,013	39		
8	12 12	8314	−68	140	+10	69	97	1	F	Do.
		8313	−56	161	−14	57	73	3		
		8313	−53	164	−15	54	97	4		
		8316	−13	204	+17	21	24	2		
		8307	−12	205	+36	37	24	1		
		8305	+11	228	−25	27	48	2		
		8305	+15	232	−24	28	73	6		
		8298	+65	282	−22	67	97	1		
		8315	+75	292	−17	76	194	2		
		8309	+83	300	−18	84	170	1		
		(8)		(217)	(0)		807	23		
9	10 43	8317	−65	140	+27	68	24	1	F	Do.
		8314	−55	150	+10	56	73	1		
		8313	−39	166	−15	41	73	1		
		8316	−3	202	+18	19	24	1		
		8316	+1	206	+18	18	24	1		
		8307	+2	207	+36	36	24	1		
		8305	+23	228	−25	34	48	3		
		8305	+27	232	−25	37	48	5		
		8310	+55	260	+32	60	48	2		
		8298	+78	283	−22	78	97	1		
		(8)		(205)	(0)		483	17		
10	11 4	8319	−85	106	−10	85	291	3	F	Do.
		8319	−79	112	−4	79	339	1		
		8317	−49	142	+27	54	121	6		
		8314	−41	150	+10	43	48	1		
		8313	−26	165	−15	30	73	8		
		8318	−19	172	−22	29	24	2		
		8316	+14	205	+18	24	145	11		
		8307	+15	206	+37	41	16	1		
		8305	+35	226	−25	42	24	1		
		8305	+41	232	−26	47	48	3		
		8310	+69	260	+32	71	97	5		
		(9)		(191)	(0)		1,226	42		
11	14 1	8320	−76	100	−20	76	121	3	G	Do.
		8319	−75	101	−7	75	970	10		
		8319	−70	106	−10	70	582	10		
		8319	−65	111	−4	65	582	1		
		8317	−36	140	+27	43	24	2		
		8317	−30	146	+27	40	12	4		
		8314	−25	151	+9	26	48	1		
		8314	−11	165	−15	18	48	7		
		8313	−8	168	−14	15	6	1		
		8318	−5	171	−25	25	12	2		
		8316	+28	204	+17	33	242	6		
		8316	+32	208	+16	35	267	3		
		8310	+81	257	+32	81	97	2		
		(8)		(176)	(0)		3,011	52		
12	11 22	8320	−72	93	−23	73	242	11	VG	Mt. Wilson.
		8319	−70	95	−12	70	121	14		
		8320	−64	101	−20	65	145	4		
		8319	−63	102	−7	63	1,164	7		
		8319	−58	107	−12	58	630	12		
		8319	−57	108	−7	57	145	16		
		8319	−52	113	−3	52	533	1		
		8317	−24	141	+26	36	16	3		
		8314	−13	152	+9	15	48	1		
		8321	−3	162	−32	32	12	6		
		8313	0	165	−15	14	121	7		
		8313	+4	169	−13	15	97	2		
		8316	+41	206	+17	45	145	17		
		8316	+46	211	+17	48	218	5		
		8305	+71	236	−24	72	12	1		
		(8)		(165)	(−1)		3,649	107		

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR DECEMBER 1946—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1946	h m		°	°	°	°				
Dec. 13	10 39	8320	−61	91	−23	63	194	1	F	U. S. Naval.
		8319	−55	97	−11	56	121	5		
		8320	−50	102	−20	53	145	2		
		8319	−49	103	−6	49	1, 164	12		
		8319	−43	109	−9	43	436	16		
		8319	−42	110	−4	42	145	3		
		8319	−39	113	−3	39	582	1		
		8319	−38	114	−4	38	12	1		
		8314	0	152	+9	10	24	1		
		8313	+6	158	−12	11	97	1		
		8313	+12	164	−14	16	48	5		
		8322	+35	187	+17	39	48	3		
		8316	+51	203	+17	54	194	2		
		8316	+58	210	+17	60	291	1		
		(6)		(152)	(−1)		3, 501	54		
14	13 16	8324	−75	62	+13	76	291	3	G	Do.
		8320	−48	89	−23	52	170	2		
		8320	−41	96	−22	45	24	3		
		8319	−30	98	−12	41	291	7		
		8320	−37	100	−20	41	73	1		
		8319	−35	102	−7	35	970	20		
		8319	−28	109	−10	29	436	21		
		8319	−27	110	−6	27	194	8		
		8319	−24	113	−3	24	582	1		
		8314	+13	150	+10	17	24	6		
		8313	+32	169	−12	34	73	2		
		8323	+42	179	−22	45	12	3		
		8316	+67	204	+17	69	194	2		
		8316	+72	209	+17	74	194	2		
		(7)		(137)	(−1)		3, 528	81		
15	10 40	8326	−78	48	+10	80	485	3	VG	Mt. Wilson.
		8324	−67	59	+12	68	194	30		
		8324	−61	65	+12	62	291	1		
		8320	−36	90	−23	40	73	11		
		8320	−29	97	−22	33	24	9		
		8319	−27	99	−12	29	194	30		
		8320	−25	101	−20	30	73	1		
		8319	−22	104	−8	23	1, 164	40		
		8319	−15	111	−7	16	291	43		
		8319	−15	111	−11	17	194	1		
		8319	−11	115	−3	11	582	1		
		8321	+38	164	−32	47	48	12		
		8313	+41	167	−15	43	24	14		
		8313	+48	174	−12	49	73	6		
		8325	+52	178	−24	55	48	4		
		8323	+57	183	−22	59	6	1		
		8316	+77	203	+15	78	291	5		
		(9)		(126)	(−1)		4, 055	212		
16	11 15	8326	−64	48	+12	65	388	5	F	U. S. Naval.
		8324	−55	57	+15	57	145	10		
		8324	−47	65	+14	49	218	1		
		8320	−23	89	−22	30	73	2		
		8319	−16	96	−12	18	194	5		
		8327	−14	98	+22	27	48	2		
		8320	−11	101	−20	21	61	1		
		8319	−9	103	−7	11	970	24		
		8319	−2	110	−10	9	194	1		
		8319	−1	111	−6	5	242	22		
		8319	+2	114	−3	2	582	1		
		(*)	+45	157	+24	50	73	2		
		8321	+48	160	−32	54	61	2		
		8321	+53	165	−31	59	48	1		
		8313	+53	165	−17	55	73	6		
		8313	+60	172	−12	60	97	3		
		8325	+65	177	−23	67	73	3		
		(9)		(112)	(−1)		3, 540	91		
17	10 19	8329	−80	19	+15	80	48	1	F	Do.
		8326	−50	49	+12	51	533	4		
		8324	−41	58	+15	44	291	10		
		8324	−33	66	+14	35	242	1		
		8328	−11	88	+17	21	24	2		
		8320	−10	89	−22	22	61	1		
		8319	−2	97	−12	11	194	3		
		8320	+2	101	−20	19	61	1		
		8319	+4	103	−7	7	970	13		
		8319	+11	110	−10	14	97	1		
		8319	+12	111	−6	12	291	10		
		8319	+15	114	−3	15	582	1		
		8321	+62	161	−32	65	121	2		
		8321	+68	167	−31	70	97	2		
		8313	+68	167	−17	69	97	1		
		8313	+72	171	−12	72	145	2		
		8325	+78	177	−25	79	48	3		
		(9)		(99)	(−1)		3, 902	58		

See footnotes at end of table.

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR DECEMBER 1946—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1946	h m		°	°	°	°				
Dec. 18	11 47	8329	−66	19	+15	67	48	1	VG	U. S. Naval.
		8326	−38	47	+12	40	606	3		
		8324	−27	58	+15	31	388	29		
		8324	−19	66	+14	25	218	1		
		8328	+2	87	+19	20	12	1		
		8320	+3	88	−22	21	12	6		
		8319	+11	96	−12	14	194	17		
		8320	+15	100	−20	23	61	1		
		8319	+18	103	−8	20	582	22		
		8319	+21	106	−7	21	291	17		
		8319	+26	111	−6	26	145	18		
		8319	+26	111	−10	27	121	1		
		8319	+29	114	−3	29	558	1		
		8321	+74	159	−32	76	145	2		
		8321	+81	166	−31	82	97	2		
		8313	+81	166	−14	81	121	2		
		(8)		(85)	(−1)		3, 509	124		
19	10 50	8331	−69	4	−10	69	73	1	G	Do.
		8329	−56	17	+14	58	24	1		
		8329	−50	23	+15	52	24	1		
		8326	−28	45	+12	31	24	3		
		8326	−25	48	+11	27	727	1		
		8324	−17	56	+13	23	194	15		
		8324	−12	61	+12	17	242	18		
		8330	−11	62	+24	27	12	3		
		8324	−4	69	+12	13	242	1		
		8328	+15	88	+17	24	12	1		
		8319	+26	99	−12	28	267	16		
		8320	+28	101	−20	33	48	1		
		8319	+31	104	−8	32	533	21		
		8319	+38	111	−10	39	194	6		
		8319	+42	115	−5	42	582	1		
		(8)		(73)	(−1)		3, 198	90		
20	13 18	8332	−81	337	−16	81	12	1	VG	Mt. Wilson.
		8332	−78	340	−17	78	97	1		
		8331	−60	356	−10	60	48	10		
		8331	−55	3	−12	56	36	3		
		8329	−44	14	+13	46	97	7		
		8329	−39	19	+15	42	97	5		
		8326	−12	46	+12	18	727	10		
		8324	6	58	+13	15	242	69		
		8330	+2	60	+24	36	6	1		
		8324	+10	68	+12	16	242	1		
		8319	+40	98	−11	41	242	40		
		8320	+42	100	−19	44	48	1		
		8319	+45	103	−8	45	242	35		
		8319	+45	103	−7	45	291	1		
		8319	+51	109	−8	51	170	15		
		8319	+56	114	−4	56	533	1		
		(8)		(58)	(−2)		3, 130	201		
22	11 14	8336	−82	311	−15	82	121	1	F	U. S. Naval.
		8335	−69	324	+20	75	291	4		
		(*)	−61	332	−6	61	12	1		
		8332	−54	339	−16	56	48	2		
		8332	−49	344	−17	51	121	2		
		8333	−33	0	+27	42	97	7		
		8331	−30	3	−9	31	61	4		
		8329	−17	16	+15	24	194	1		
		8329	−11	22	+16	21	97	9		
		8326	+17	50	+12	22	727	8		
		8324	+26	59	+14	30	194	20		
		8324	+39	72	+13	42	242	1		
		8319	+61	94	−9	61	6	1		
		8320	+66	99	−19	68	24	1		
		8319	+70	103	−8	70	339	4		
		8319	+78	111	−9	78	97	1		
		8319	+82	115	−4	82	388	1		
		(11)		(33)	(−2)		3, 059	68		
23	12 12	8336	−71	308	−15	72	24	1	F	Do.
		8336	−69	310	−16	69	194	2		
		8335	−60	319	+20	62	73	2		
		8334	−58	321	−17	61	73	1		
		8335	−57	322	+19	60	436	2		
		8334	−53	326	−17	55	97	2		
		8332	−40	339	−16	42	48	4		
		8332	−37	342	−17	40	61	1		
		8333	−21	358	+27	36	242	9		
		8333	−18	1	+27	35	315	1		
		8329	−5	14	+15	18	194	3		
		8329	+2	21	+16	18	145	5		
		8326	+29	48	+12	32	970	3		
		8326	+41	60	+14	44	194	6		
		8324	+50	69	+13	52	388	1		
		(8)		(19)	(−2)		3, 454	43		

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR DECEMBER 1946—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1946	h m		°	°	°	°[V]				
Dec. 24	10 27	8337	−78	289	−19	78	97	4	G	U. S. Naval.
		8336	−58	309	−15	59	194	2		
		8335	−49	318	+21	52	73	7		
		8334	−45	322	−17	47	61	5		
		8335	−43	324	+19	47	339	3		
		8334	−40	327	−17	42	97	2		
		8332	−29	338	−16	32	48	4		
		8332	−24	343	−17	28	73	1		
		8333	−9	358	+27	31	388	16		
		8333	−4	3	+27	30	436	1		
		8329	+8	15	+15	19	194	2		
		8329	+11	18	+15	21	12	1		
		8329	+17	24	+16	25	97	4		
		8326	+40	47	+12	42	873	4		
		8326	+48	55	+13	50	121	8		
		8326	+59	66	+15	61	24	1		
		8324	+61	68	+12	62	291	1		
		(9)		(7)	(−2)		3,418	66		
26	11 0	8338	−80	261	+17	80	242	2	G	Do.
		8337	−50	291	−21	52	61	8		
		8337	−43	298	−19	45	97	3		
		8336	−30	311	−18	33	73	6		
		8334	−19	322	−19	25	48	3		
		8335	−18	323	+19	28	24	4		
		8335	−16	325	+17	24	388	2		
		8334	−14	327	−18	21	6	1		
		8334	−10	331	−19	20	121	1		
		8332	0	341	−17	15	61	9		
		8332	+4	345	−18	16	48	1		
		8333	+13	354	+26	30	533	3		
		8333	+19	0	+26	33	145	2		
		8333	+25	6	+26	31	436	2		
		8329	+34	15	+14	38	121	10		
		8329	+42	23	+15	45	97	4		
		8326	+69	50	+12	70	582	1		
		(9)		(341)	(−2)		3,083	62		
27	11 12	8338	−69	258	+19	70	145	1	F	Do.
		8338	−68	259	+17	70	145	1		
		8337	−38	289	−21	41	73	3		
		8337	−29	298	−18	33	48	4		
		8336	−18	309	−17	23	97	1		
		8334	−7	320	−19	18	12	1		
		8335	−7	320	+20	22	73	4		
		8335	−1	326	+18	20	339	2		
		8334	+2	329	−18	16	85	1		
		8332	+14	341	−17	21	97	2		
		8333	+27	354	+26	38	485	1		
		8333	+31	358	+25	40	97	7		
		8333	+38	5	+26	45	242	2		
		8329	+50	17	+16	52	97	5		
		8329	+59	26	+16	61	73	1		
		8326	+83	50	+12	83	582	1		
		(9)		(327)	(−2)		2,690	37		
28	10 21	8339	−70	244	+35	74	145	1	F	Do.
		8339	−65	249	+34	70	61	1		
		8339	−58	256	+31	64	48	1		
		8338	−55	259	+18	59	145	1		
		8338	−53	261	+17	56	194	1		
		8337	−25	289	−21	31	48	6		
		8337	−15	299	−18	22	61	5		
		8336	−5	309	−17	16	73	3		
		8335	−4	310	+20	23	12	3		
		8335	+6	320	+20	24	12	2		
		8334	+6	320	−18	18	12	1		
		8335	+10	324	+18	23	339	6		
		8334	+15	329	−17	21	97	1		
		8332	+26	340	−16	28	170	10		
		8333	+38	352	+26	46	485	5		
		8331	+48	2	−12	49	12	2		
		8333	+51	5	+26	58	291	4		
		8329	+65	19	+16	68	97	2		
		8329	+70	24	+17	71	73	1		
		(10)		(314)	(−3)		2,375	56		
29	11 12	8339	−56	245	+35	65	97	3	F	Mt. Wilson.
		8339	−50	251	+32	60	73	1		
		8339	−41	260	+29	50	48	2		
		8338	−39	262	+17	43	242	2		

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR DECEMBER 1946—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1946	h m		°	°	°	°				
Dec. 29	11 12	8337	−1	300	−19	17	121	7	F	Mt. Wilson.
		8336	+9	310	−18	18	48	4		
		8335	+24	325	+16	30	339	4		
		8334	+29	330	−18	33	97	1		
		8332	+41	342	−17	43	61	1		
		8333	+51	352	+25	57	339	1		
		8333	+59	0	+25	63	121	2		
		8331	+62	3	−13	63	16	5		
		8333	+64	5	+25	68	291	1		
		8329	+70	11	+15	71	48	4		
		(10)		(301)	(−3)		1,941	38		
30	10 7	8339	−46	242	+35	58	145	1	F	U. S. Naval.
		8339	−43	245	+34	56	12	1		
		8339	−39	249	+32	51	170	5		
		8338	−34	254	+20	41	24	4		
		8339	−32	256	+31	46	24	1		
		8338	−29	259	+18	37	97	1		
		8338	−28	260	+17	35	121	1		
		8337	+10	298	−20	21	48	1		
		8337	+15	303	−19	22	36	1		
		8336	+21	309	−18	25	48	1		
		8335	+38	326	+16	42	73	5		
		8335	+39	327	+17	44	339	1		
		8334	+40	328	−16	42	97	1		
		8332	+53	341	−17	54	73	4		
		8333	+62	350	+26	67	485	2		
		8333	+70	358	+26	72	242	3		
		8333	+81	9	+26	82	242	1		
		(8)		(288)	(−3)		2,276	34		
31	12 23	8339	−32	241	+34	48	97	2	P	Mt. Wilson.
		8339	−24	249	+32	41	145	1		
		8338	−14	259	+18	26	61	1		
		8338	−12	261	+17	24	97	1		
		8340	−8	265	−21	20	12	1		
		8337	+29	302	−18	32	48	1		
		8335	+52	325	+16	55	291	1		
		8334	+55	328	−17	57	61	1		
		(6)		(273)	(−3)		812	9		

Mean daily area for 29 days = 2,337
Mean 10 g+s for 29 days = 150.2

(*) Not numbered.
VG = very good; G = good; F = fair; P = poor.

PROVISIONAL RELATIVE SUNSPOT NUMBERS FOR DECEMBER 1946

[Dependent on observations at Zurich Observatory and its stations at Locarno and Arosa.]

December 1946	Relative numbers	December 1946	Relative numbers	December 1946	Relative numbers
1	84	11	119	21	126
2	88	12	127	22	138
3	79	13	99	23	147
4	104	14	116	24	152
5	102	15	165	25	148
6	93	16	150	26	145
7	111	17	143	27	144
8	87	18	143	28	154
9	73	19	141	29	132
10	103	20	145	30	116
				31	98

Mean, 31 days = 121.7
Mean for the year 1946 = 92.4

Annual Temperature Departures (°F.) in the United States, 1946

Annual Temperature Departures (°F.) in the United States, 1946

Percentage of Normal Annual Precipitation in the United States, 1946

Tracks of North Atlantic Hurricanes and Tropical Disturbances of 1946

Tracks of North Atlantic Hurricanes and Tropical Disturbances of 1946

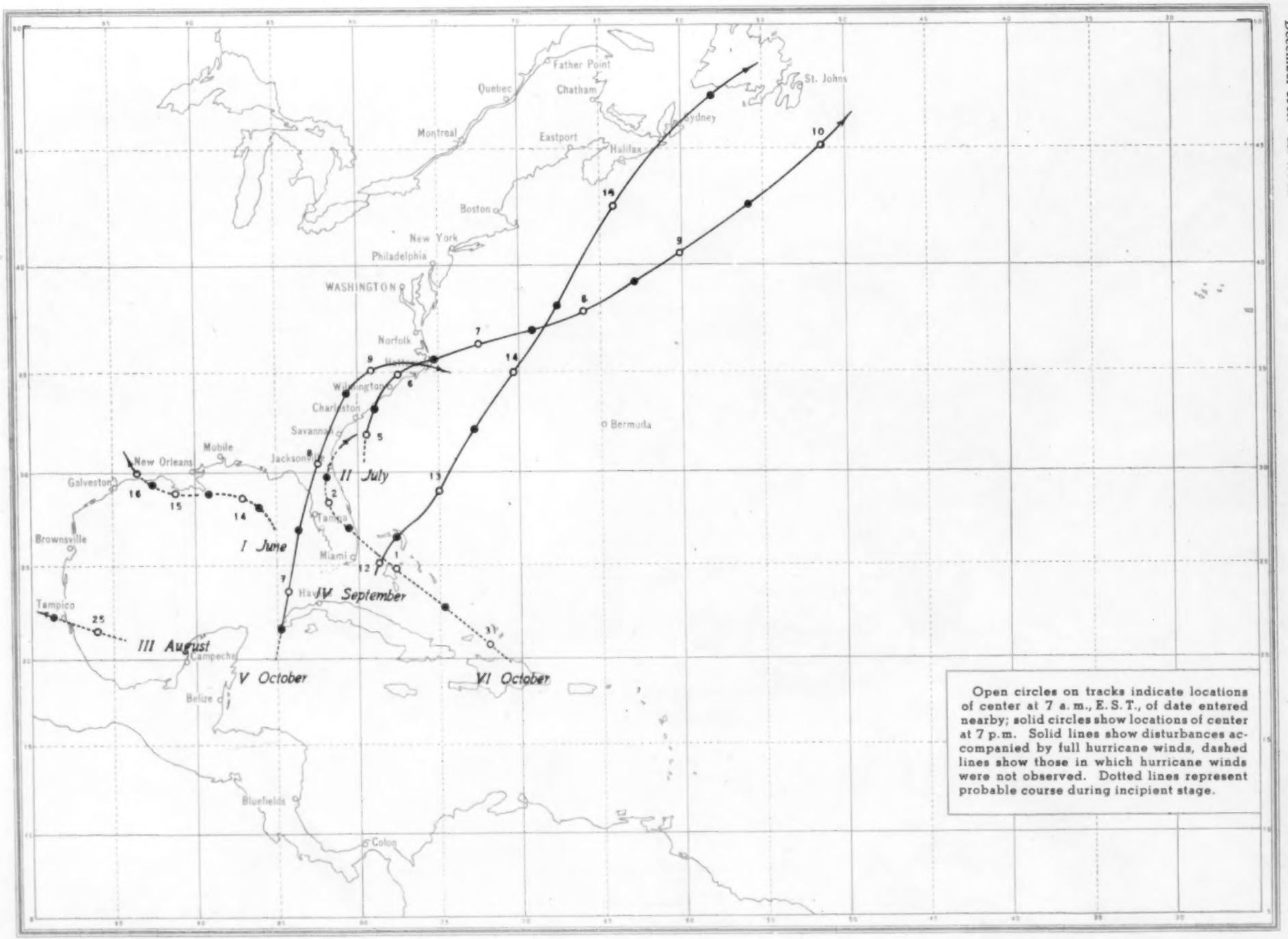


Chart I. Departure (°F.) of the Mean Temperature from the Normal, and Wind Roses for Selected Stations, December 1946

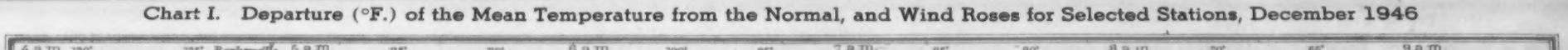
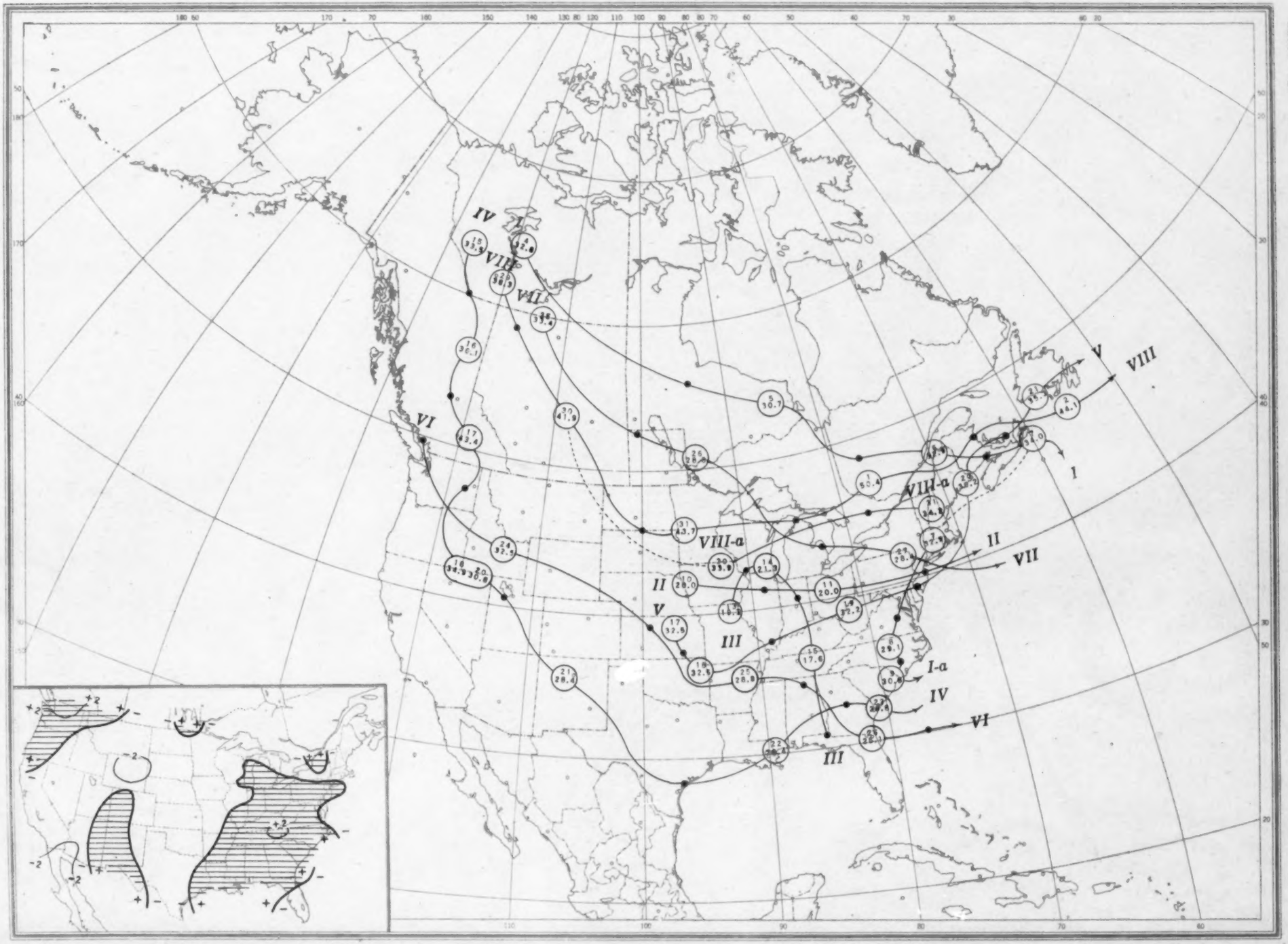


Chart I. Departure (°F.) of the Mean Temperature from the Normal, and Wind Roses for Selected Stations, December 1946

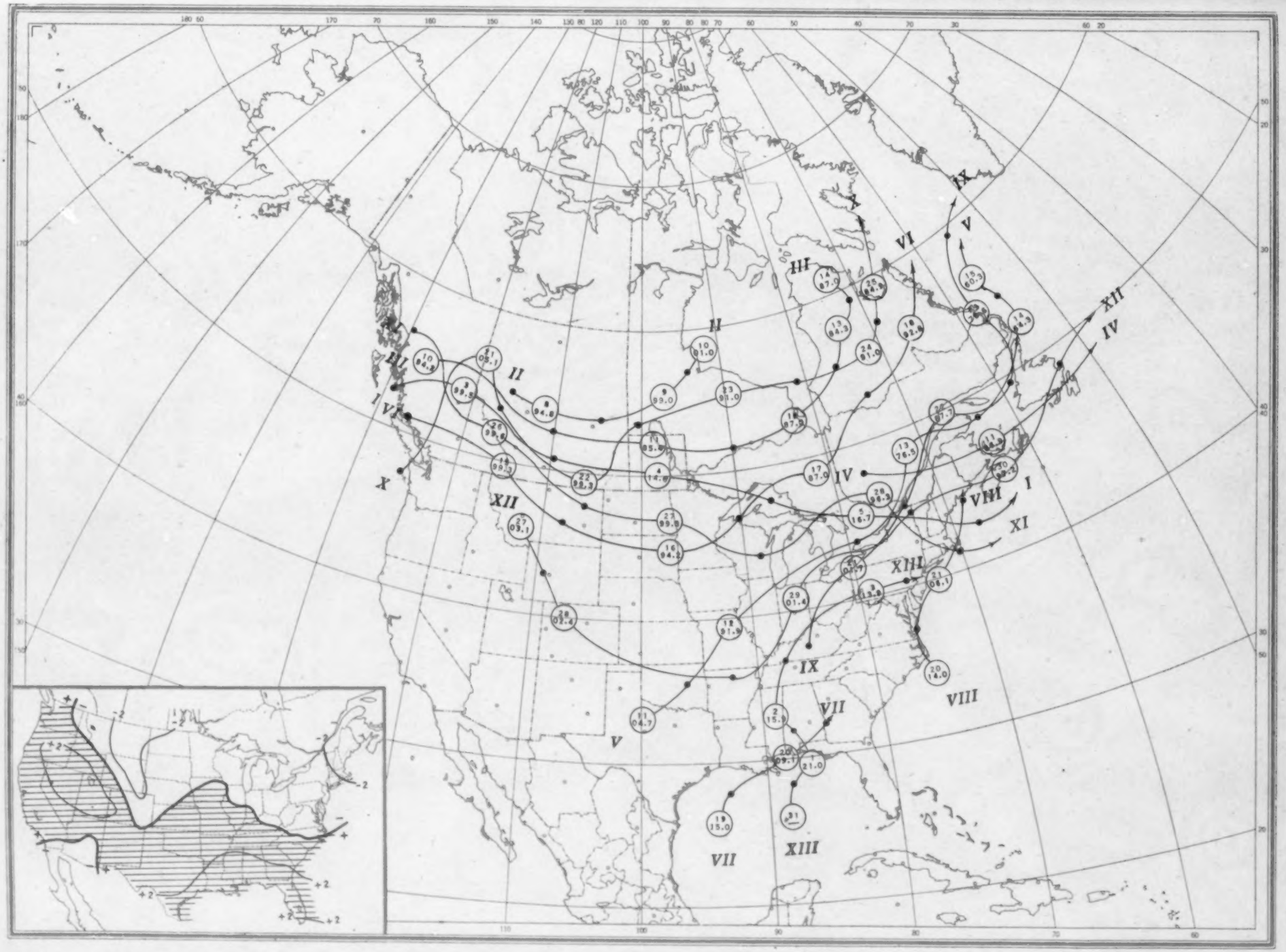
Chart II. Tracks of Centers of Anticyclones, December 1946. (Inset) Departure of Monthly Mean Pressure from Normal.



Circle indicates position of anticyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of anticyclone at 7:30 p. m. (75th meridian time)

Chart III. Tracks of Centers of Cyclones, December 1946. (Inset) Change in Mean Pressure from Preceding Month

Chart III. Tracks of Centers of Cyclones, December 1946. (Inset) Change in Mean Pressure from Preceding Month



Circle indicates position of cyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of cyclone at 7:30 p. m. (75th meridian time)

Chart IV. Percentage of Clear Sky Between Sunrise and Sunset, December 1946

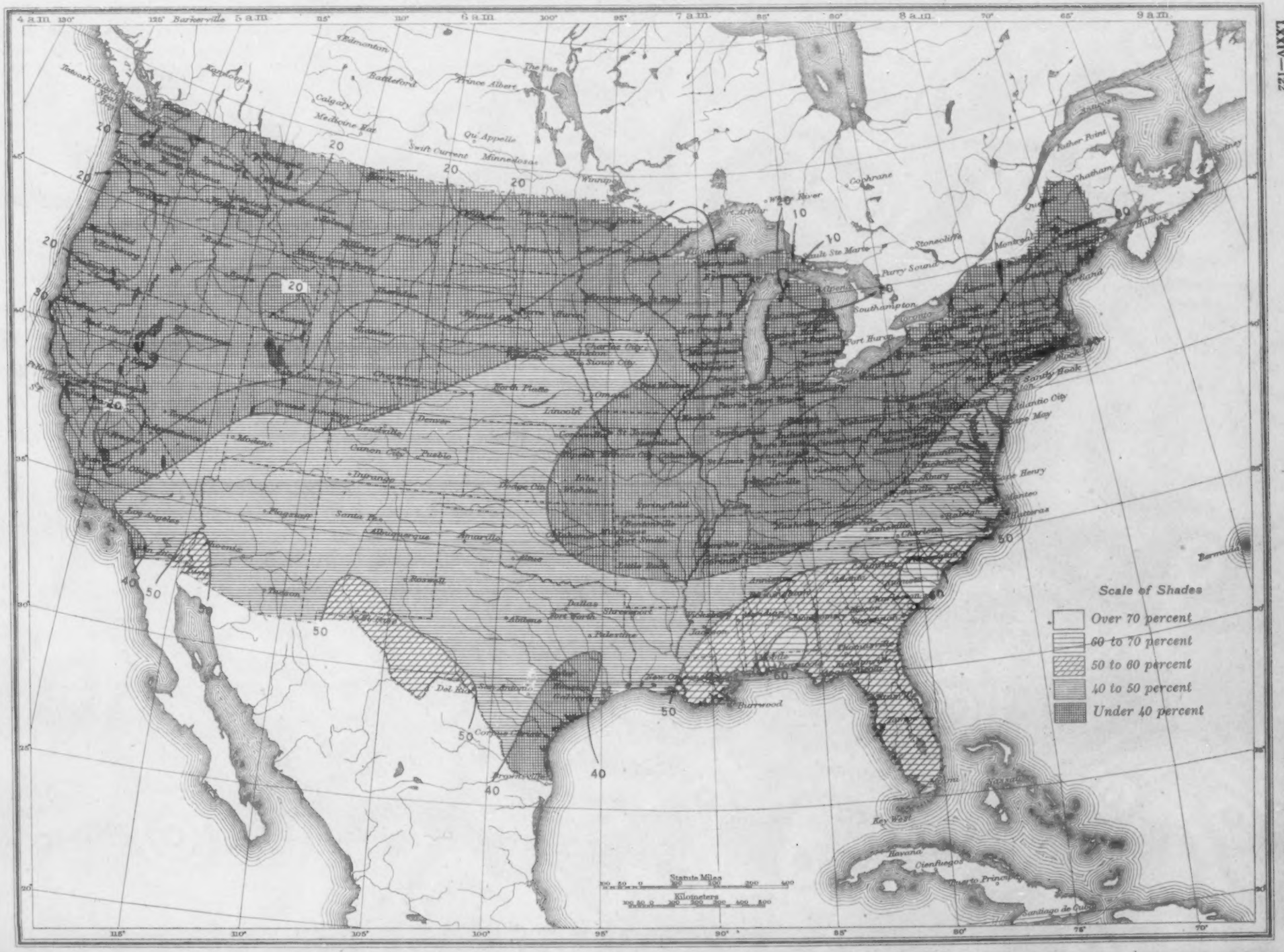


Chart V. Total Precipitation, Inches, December 1946. (Inset) Departure of Precipitation from Normal

Chart V. Total Precipitation, Inches, December 1946. (Inset) Departure of Precipitation from Normal

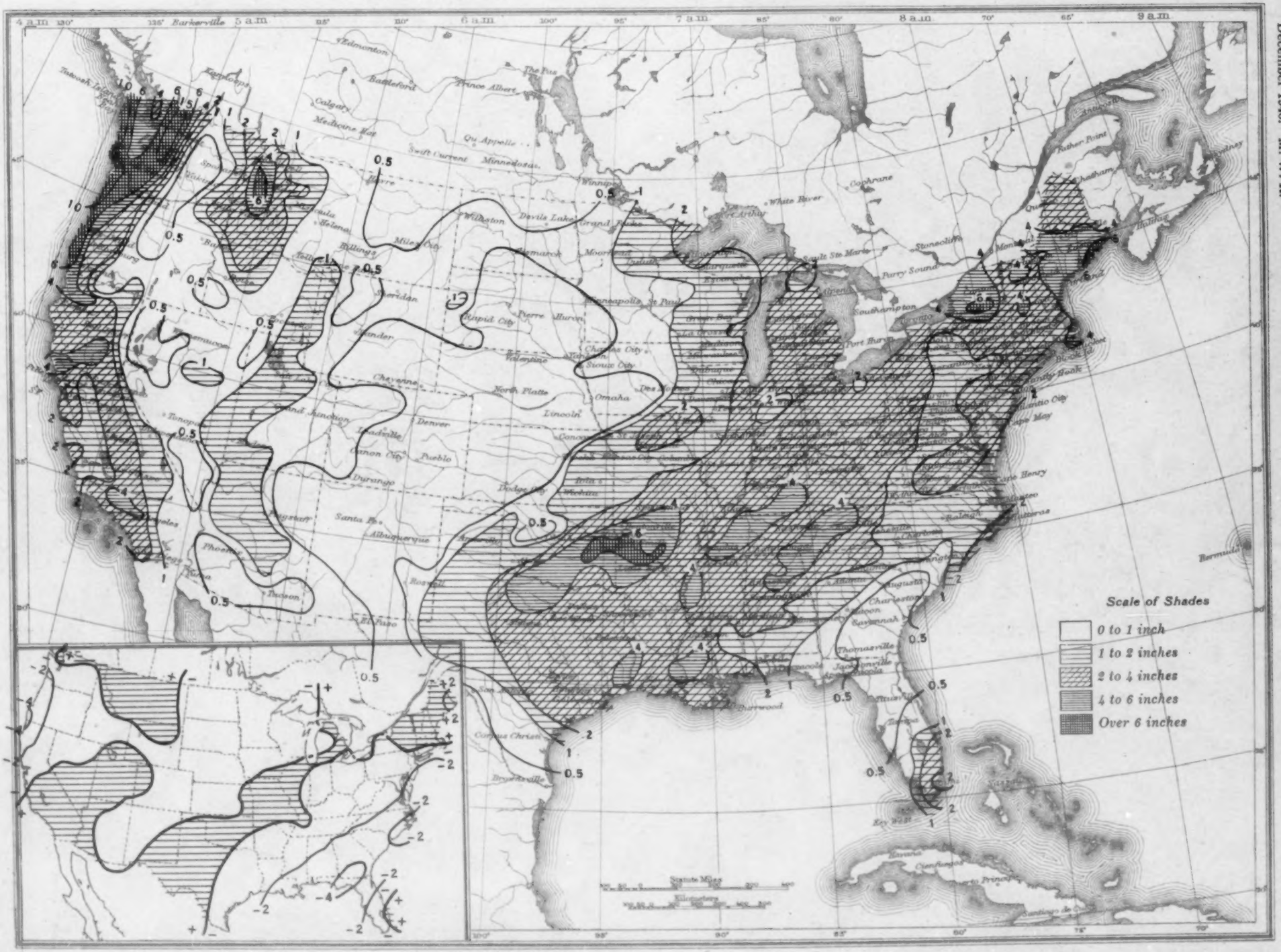


Chart VI. Isobars (mb.), at Sea Level and Isotherms (°F.) at Surface; Prevailing Winds, December 1946

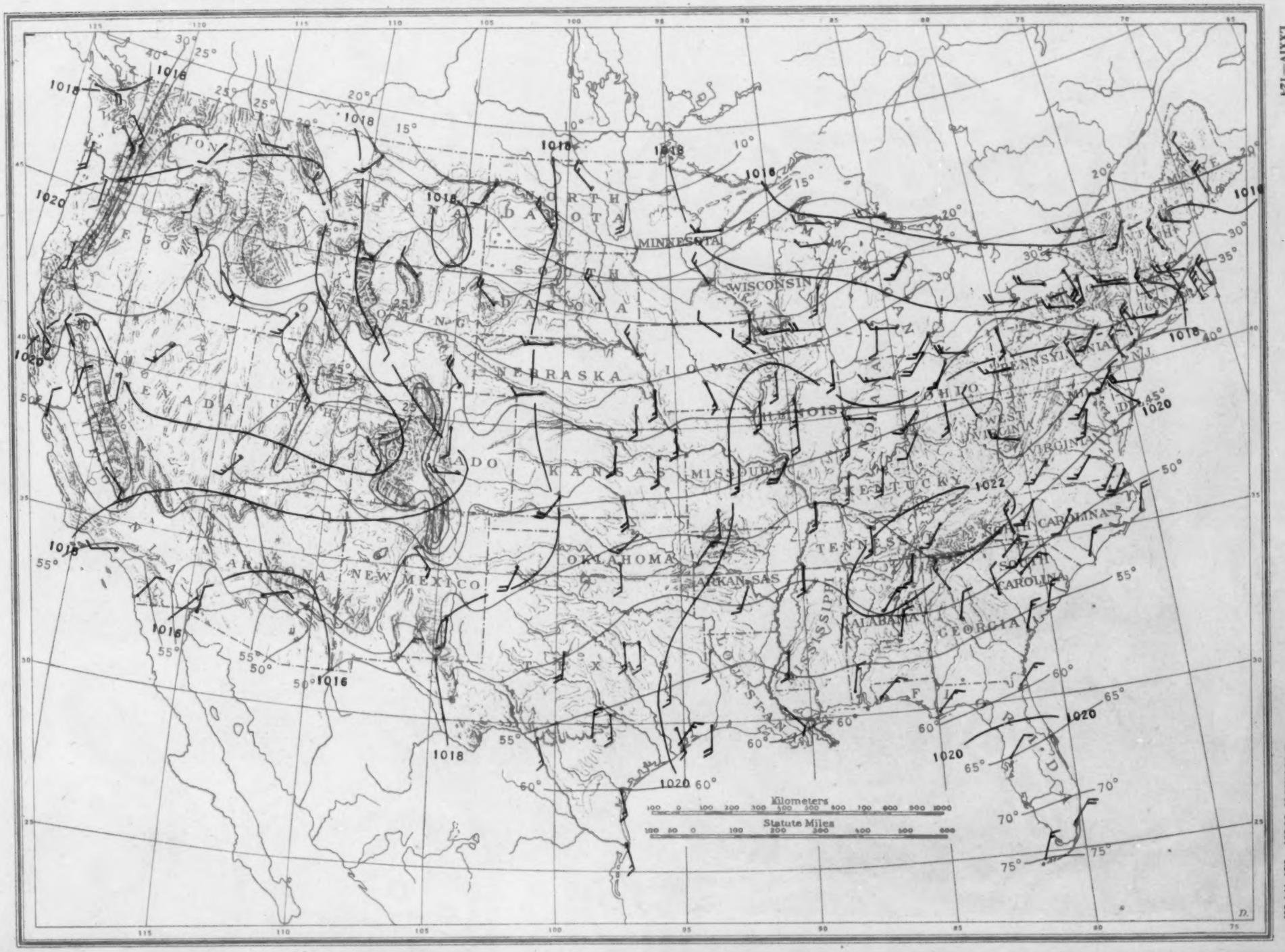


Chart VII. Total Snowfall, Inches, December 1946. (Inset) Depth of Snow on the Ground at 7:30 p. m., Monday, December 30, 1946

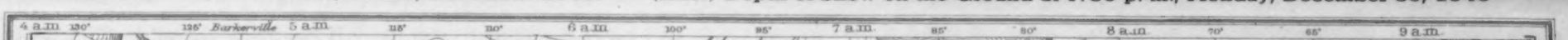
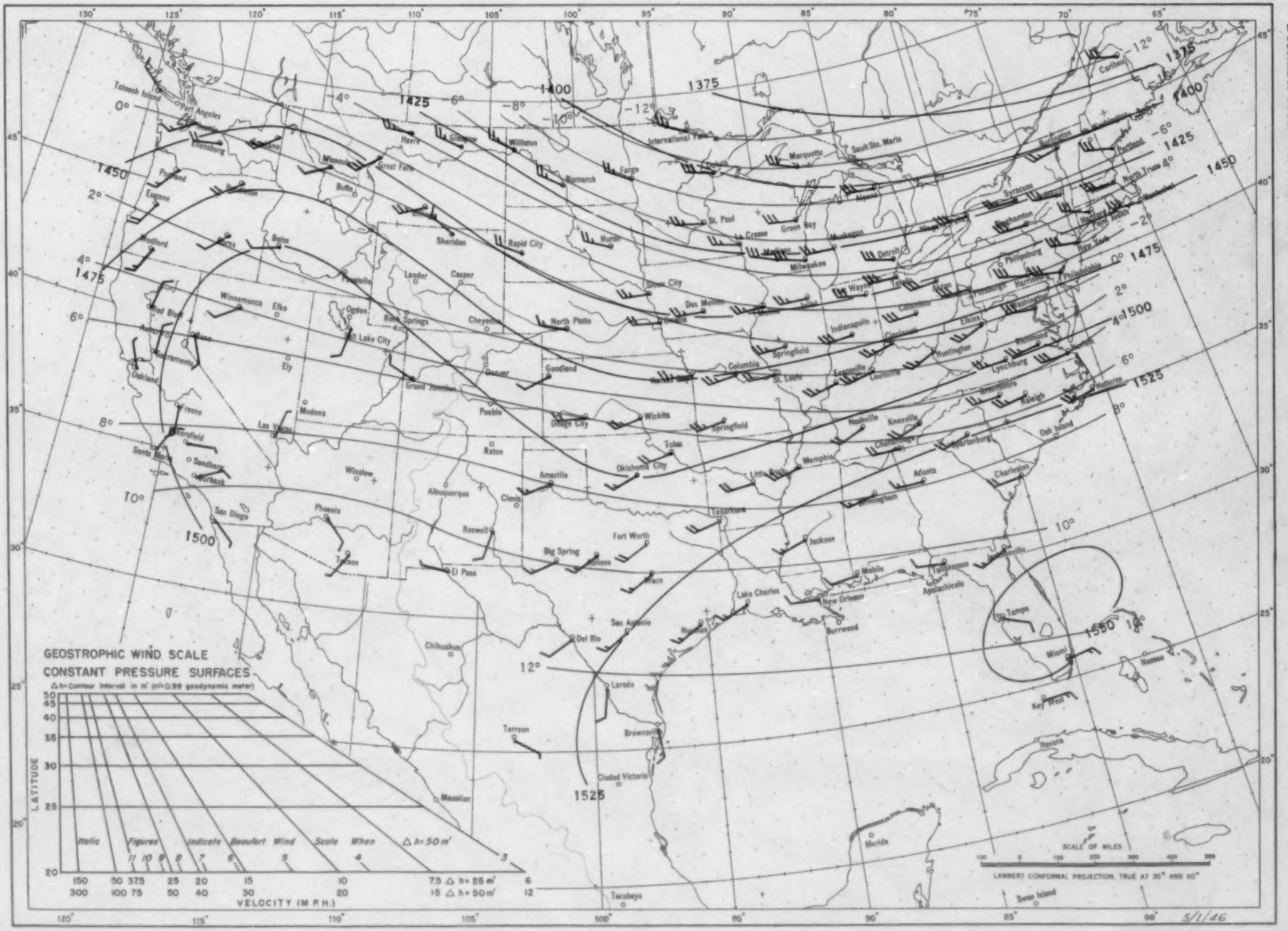


Chart VII. Total Snowfall, Inches, December 1946. (Inset) Depth of Snow on the Ground at 7:30 p. m., Monday, December 30, 1946

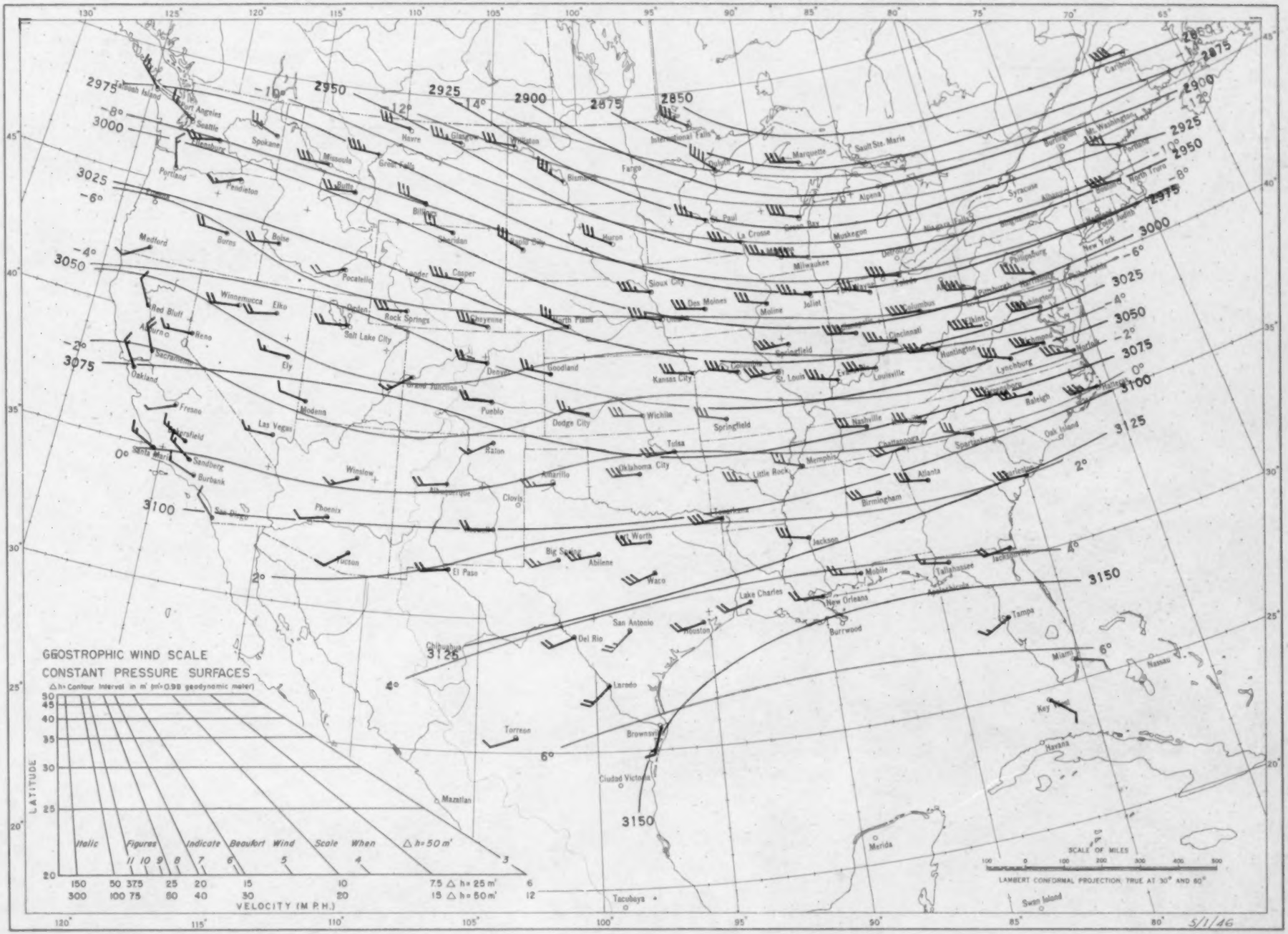
Chart VIII, December 1946. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meter and Isotherms in Degrees Centigrade for the 850-millibar Pressure Surface, and Resultant Winds at 1,500 Meters (m.s.l.)

Chart VIII, December 1946. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meter and Isotherms in Degrees Centigrade for the 850–millibar Pressure Surface, and Resultant Winds at 1,500 Meters (m.s.l.)



Contour lines and isotherms based on radiosonde observations at 0300 G.C.T., and winds based on pilot balloon observations at 2200 G.C.T.

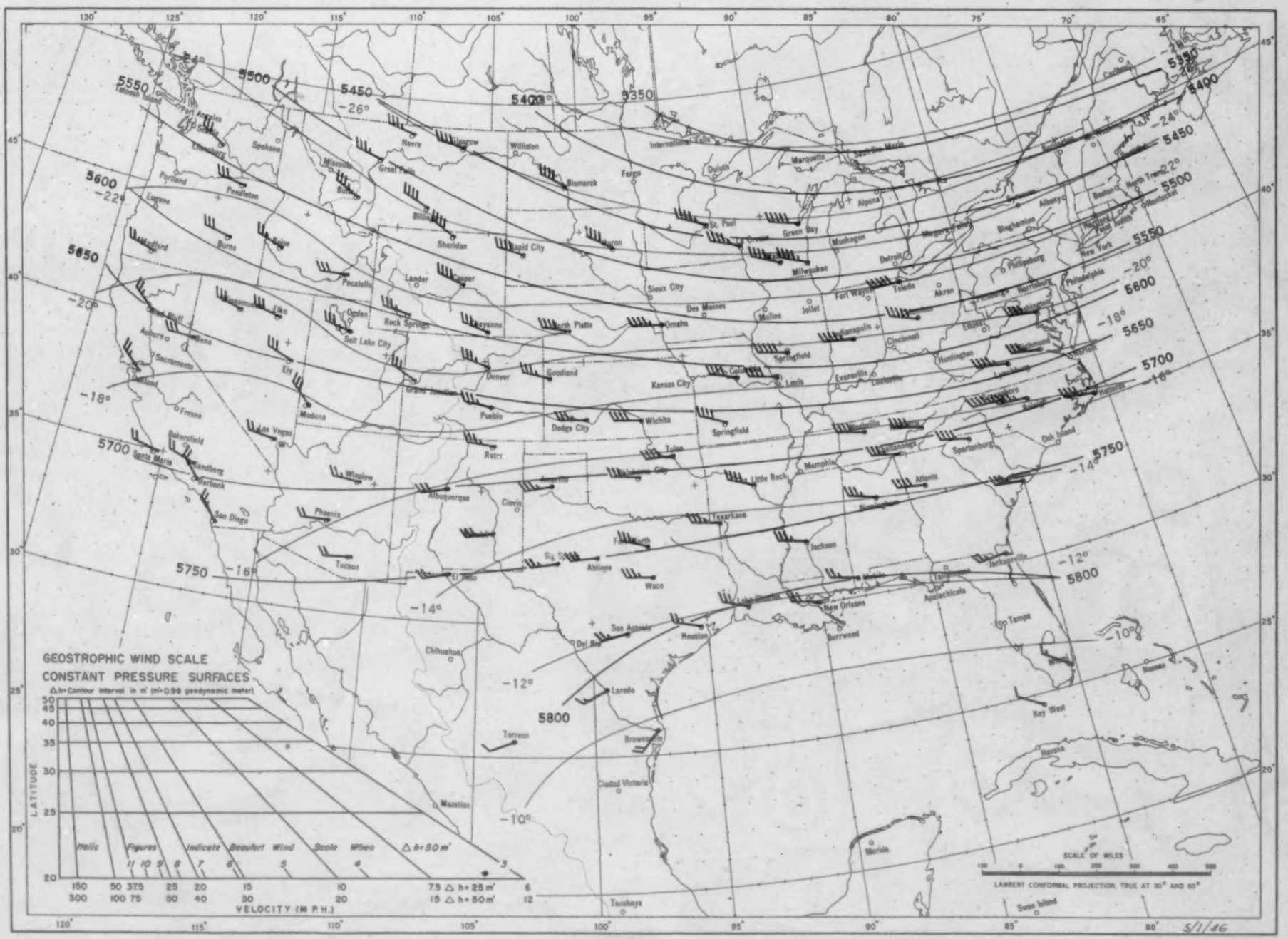
Chart IX, December 1946. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meter and Isotherms in Degrees Centigrade for the 700-millibar Pressure Surface, and Resultant Winds at 3,000 Meters (m.s.l.)


GEOSTROPHIC WIND SCALE
CONSTANT PRESSURE SURFACES
△h= Contour Interval in m' (m'=0.98 geodynamic meter)
LATITUDE
Italic Figures Indicate Beaufort Wind Scale When △h=50 m'
VELOCITY (M.P.H.)
LAMBERT CONFORMAL PROJECTION, TRUE AT 30° AND 60°
SCALE OF MILES
5/1/46

Contour lines and isotherms based on radiosonde observations at 0300 G.C.T., and winds based on pilot balloon observations at 2200 G.C.T.

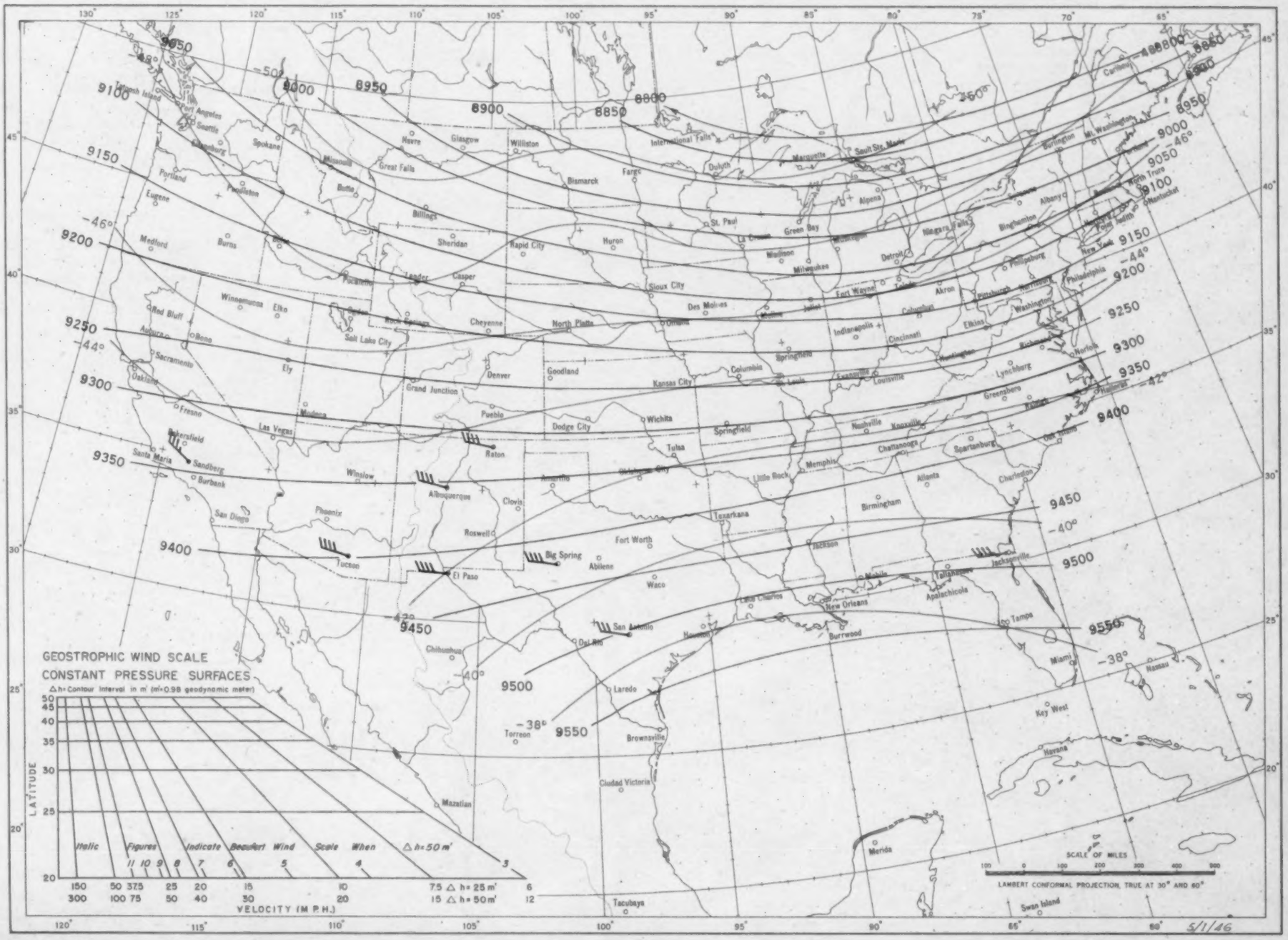
Chart X, December 1946. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meter and Isotherms in Degrees Centigrade for the 500-millibar Pressure Surface, and Resultant Winds at 5,000 Meters (m.s.l.)

Chart X, December 1946. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meter and Isotherms in Degrees Centigrade for the 500-millibar Pressure Surface, and Resultant Winds at 5,000 Meters (m.s.l.)


GEOSTROPHIC WIND SCALE
CONSTANT PRESSURE SURFACES
Δh= Contour interval in m' (m'=0.98 geodynamic meter)
LATITUDE
Italic Figures indicate Beaufort Wind Scale When Δh=50 m'
VELOCITY (M.P.H.)
150 50 375 25 20 15 10 7.5 Δh=25 m' 6
300 100 75 50 40 30 20 15 Δh=50 m' 12
LAMBERT CONFORMAL PROJECTION, TRUE AT 30° AND 60°
SCALE OF MILES
5/1/46

Contour lines and isotherms based on radiosonde observations at 0300 G.C.T., and winds based on pilot balloon observations at 2200 G.C.T.

Chart XI, December 1946. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meter and Isotherms in Degrees Centigrade for the 300-millibar Pressure Surface, and Resultant Winds at 10,000 Meters (m.s.l.)


GEOSTROPHIC WIND SCALE
CONSTANT PRESSURE SURFACES
△h=Contour Interval in m' (m'=0.98 geodynamic meter)
LATITUDE
Italic Figures Indicate Beaufort Wind Scale When △h=50 m'
VELOCITY (M.P.H.)
150 50 375 25 20 15 10 7.5 △h=25 m' 6
300 100 75 50 40 30 20 15 △h=50 m' 12
SCALE OF MILES
LAMBERT CONFORMAL PROJECTION, TRUE AT 30° AND 60°
5/1/46

Contour lines and isotherms based on radiosonde observations at 0300 G.C.T., and winds based on pilot balloon observations at 2200 G.C.T.

MONTHLY WEATHER REVIEW

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